

# 1978 EDP INDUSTRY ANALYSIS

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1978 EDP Industry Analysis

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## 1978 EDP INDUSTRY ANALYSIS

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## I INTRODUCTION





## I INTRODUCTION

- This report is produced by INPUT as part of the EDP User Panel Program. Information contained in this report stems from questionnaire data provided by the top FORTUNE 1350 companies on the operation of their EDP Departments. This research was conducted by INPUT during 1978 and covers topics including:
  - EDP budgets and growth expectations.
  - EDP objectives, plans, and problems.
  - Analysis of major technical issues and resulting trends.
- Information is provided for each of nine major industry sectors:
  - Discrete Manufacturing.
  - Process Manufacturing.
  - Transportation.
  - Utilities.
  - Wholesale Distribution.

- Retail Distribution
  - Banking and Finance.
  - Insurance.
  - Services, Education, and Other.
- Nearly 500 questionnaires were completed and analyzed for this study, and included mail, telephone, and on-site contacts. The majority of interviews were conducted with senior EDP managers and MIS directors, and in about 20 cases with corporate executives.
  - Primary research for this report was supplemented by other INPUT research projects conducted in 1978 as part of its Market Analysis Service (MAS), Small Establishment Service (SES) programs, and User Planning Service Program.
  - This report emphasizes the status of EDP departments with respect to such technological developments as distributed data processing (DDP), data base management systems (DBMS), and office automation. It is not intended to be a definitive work in describing trends in these areas, but rather to permit readers to compare their status to companies in similar industries.



## II EDP/COMMUNICATIONS EXPENDITURES



## II EDP/COMMUNICATIONS EXPENDITURES

- According to most surveys on the subject, EDP/communications expenditures in the U.S. for 1978 are forecast to be between \$45 and \$47 billion. This includes more than \$8 billion which will be spent on computer services and software for the year, and reflects an overall growth of about 12.5% from 1977.

### I. OUTLOOK FOR 1979

- With few exceptions, the EDP managers and executives interviewed for this study expressed little or no concern for the general economic condition, nor did it influence their planning significantly. When queried regarding their company's growth rate with respect to their industry, most selected a nominal figure or replied that they didn't know.
  - The overall attitude toward a recession in 1979 or contingency planning in the event of a severe business downturn was one of almost universal disregard.
  - Responses ranged from slight concern in very few cases to "there's no way we could get along with any less."
- The growth prospects for the industry overall nonetheless do seem to hinge on whether or not the world enters a recessionary phase as we enter into 1979:



- In the steep recession of 1974/1975, U.S. shipments declined badly in 1975 and then recovered in 1976, indicating that the industry as a whole is recession sensitive, although a number of factors can mask the impact on a particular vendor's revenues.
  - The recent climb in the prime interest rates can be expected to result in a "subdued" order activity on the part of major EDP equipment vendors, if historical precedents hold.
  - The services industry on the other hand has proven to be more recession resistant based on performance during the two most recent business downturns.
- One prominent Wall Street analyst recently summarized his attitude as follows:
    - In 1979, most general purpose computer vendors may experience moderate slow downs in growth (8-9%).
    - Beyond 1979, these companies are likely to grow at only a 10% rate, less than 13-15% they experienced before the heralded 1979 recession.
    - Thanks to IBM's huge mid-1978 backlog and continuing high order rates, their 1979 growth rate is likely to exceed the industry's by a wide margin.
    - In 1980, IBM's expected new product line will commence shipment, supporting an annual growth of at least 12%.

## 2. EDP BUDGETS

- a. Overall
- Exhibit II-1 provides a profile summary of EDP User Panel respondents' average EDP budgets in three different size categories.

# EXHIBIT II-1

## AVERAGE EDP BUDGETS BY SIZE OF COMPANY

INDUSTRY SECTOR	COMPANY SIZE ANNUAL SALES OR ASSETS		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1 BILLION
DISCRETE MANUFACTURING	\$900K	\$2.1M	\$18.7M
PROCESS MANUFACTURING	535K	1.9M	18.7M
TRANSPORTATION	435K	1.2M	19.7M
UTILITIES	N.A.	2.4M	9.0M
WHOLESALE DISTRIBUTION	400K	1.4M	N.A.
RETAIL DISTRIBUTION	200K	1.8M	3.8M
BANKING & FINANCE	900K	2.1M	5.9M
INSURANCE	700K	3.9M	30.0M
SERVICE & OTHER	500K	1.7M	12.8M

- Companies with annual sales of less than \$100 million reported average EDP budgets as low as \$200,000 (retail industry) to a high of \$900,000 for discrete manufacturing and banking and finance. Average EDP budgets for companies with less than \$100 million in annual sales was \$571,000.
- Lowest average EDP budgets for companies in the \$100-999 million category was the transportation industry which reported an average EDP budget of \$1.2 million. Insurance companies in this size category reported the highest budget averaging \$3.9 million a year. Average EDP budgets in this size category was \$2.1 million.
- Companies who have more than \$1 billion in annual sales or assets had the widest range of average EDP budgets: \$3.8 million in the retail industry to \$30 million for insurance. Companies with over \$1 billion in revenues had an overall average EDP budget of \$14.8 million.

b. Personnel Related

- In terms of specific budget allocations, EDP expenses for personnel in 1979 will represent 45.7% of the total budget, down slightly from 46.0% in 1978. This trend is expected to continue into 1980 at which point personnel will account for 44.1% of the total budget as shown in Exhibit II-2.
- Two additional measures of the impact of personnel related expenditures on corporate budgets are the number of EDP employees as a percentage of total company employees, and the amount of EDP budget allocated for each employee.
  - The ratio of EDP employees to total employees as reported by INPUT respondents for nine industry sectors is shown in Exhibit II-3. As indicated, these ratios tend to be lower in the larger corporations, with the exception of banking/finance and insurance where the ratios are considerably higher than in other sectors.

# EXHIBIT II-2

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN ALL INDUSTRIES

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECREASE) 1978-1979
	1978	1979	1980	
MAIN COMPUTERS AND RELATED DEVICES	28.0%	27.0%	25.4%	( 9%)
SMALL COMPUTERS/ PROGRAMMABLE TERMINALS	3.1	4.5	5.6	81
NON-PROGRAMMABLE TERMINALS	3.3	3.4	3.7	12
COMMUNICATIONS	3.3	4.3	5.0	52
SOFTWARE (PURCHASE/LEASE)	3.6	4.1	4.3	19
PERSONNEL	46.0	45.7	44.1	( 4 )
OTHER	11.8	10.3	8.5	(28 )

SOURCE: INPUT EDP USER PANEL



# EXHIBIT II-3

## NUMBER OF EDP EMPLOYEES PER 100 COMPANY EMPLOYEES

INDUSTRY SECTOR	COMPANY SIZE ANNUAL SALES OR ASSETS		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1 BILLION
DISCRETE MANUFACTURING	2.3	1.6	1.0
PROCESS MANUFACTURING	1.2	1.3	1.0
TRANSPORTATION	1.4	1.2	1.3
UTILITIES	N.A.	2.9	2.1
WHOLESALE DISTRIBUTION	1.6	1.5	N.A.
RETAIL DISTRIBUTION	2.0	0.8	0.6
BANKING & FINANCE	4.2	6.2	6.2
INSURANCE	9.1	7.4	15.1
SERVICE & OTHER	2.3	1.5	1.1

- Exhibit II-4 provides a measure of the amount of EDP budget associated with each EDP employee. On average, this amount increases with the size of the company, reflecting the more advanced and sophisticated systems generally found in larger firms. Also, it more than likely reflects the higher level of staff support, training and overhead which tend to exist in larger and more widely dispersed organizations.

c. Equipment Related

- Also expected to decline as a percentage of the total EDP budget is the main computer hardware category, from 28% of the total in 1978 to 27% in 1979.
- The most dramatic increases are expected in the categories of small computers/programmable terminals and communications, each growing more than 50% during the two-year period from 1978 to 1980. These changes reflect the growing popularity of on-line applications and the emerging use of distributed data processing.

d. Services Related

- Against this growth background in the central (often the corporate) EDP area, there exists another growth component which is often misunderstood by the EDP manager, and of which he is often unaware. This is the area of computer services. INPUT observations in this regard include the following:
  - There is a clear tendency on the part of EDP managers to bring remote computing and other outside processing "in-house." These attempts have not always met with overwhelming acceptance by the end user although the tasks involved are becoming more clearly understood.
  - End users continue to be skeptical of the internal EDP operation's ability to provide a "commercial" grade of service, and except where they are forced to come "in-house," users often opt to continue with outside vendors.

## EXHIBIT II-4

EDP BUDGET DOLLARS PER EDP EMPLOYEE  
(\$000)

INDUSTRY SECTOR	COMPANY SIZE ANNUAL SALES OR ASSETS		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1 BILLION
DISCRETE MANUFACTURING	\$32.1	\$30.9	\$44.4
PROCESS MANUFACTURING	28.2	35.0	42.5
TRANSPORTATION	31.1	29.6	59.8
UTILITIES	N.A.	36.4	48.1
WHOLESALE DISTRIBUTION	28.5	36.8	N.A.
RETAIL DISTRIBUTION	22.2	29.5	30.9
BANKING & FINANCE	36.0	30.0	39.3
INSURANCE	25.0	32.2	33.5
SERVICE & OTHER	26.3	29.8	27.5
AVERAGE	\$28.7	\$32.2	\$40.8

- The net result of this situation presently is a significant difference of opinion in anticipating the growth of computer services between EDP managers/planners and end users.
- Based on the analysis of INPUT's EDP User Panel survey data, almost 450 EDP managers feel that outside processing services, i.e., interactive, remote batch, and batch, will decline by about 30% in 1978 compared to 1977. However, INPUT's studies of the services industry involving thousands of end user interviews and hundreds of vendor interviews indicate that processing services will grow by nearly 19% in 1978.
- Exhibit II-5 provides the 1977 to 1978 changes across all industry sectors for the various types of outside services as forecast by EDP managers. As shown, processing services and consulting are expected to be considerably lower, while software product and maintenance expenditures are forecast to be correspondingly higher.



## EXHIBIT II-5

EDP MANAGERS' ESTIMATES OF  
AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE  
FOR ALL INDUSTRIES

TYPE OF SERVICE	1977 EXPENDITURES AVERAGE IN \$000	1978 EXPENDITURES AVERAGE IN \$000	% CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$174	\$147	(16%)
REMOTE BATCH	253	156	(38 )
BATCH	263	158	(40 )
INPUT /OUTPUT	41	41	-
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	37	44	19
APPLICATIONS SOFTWARE	43	52	21
<u>PROFESSIONAL SERVICES</u>			
CONTRACT PROGRAMMING	111	116	5
EDP CONSULTING	63	47	(25 )
EDUCATION	23	28	22
OTHER	10	15	50
<u>FACILITIES MANAGEMENT</u>	123	123	-
<u>MAINTENANCE</u>	107	134	25

### III EDP PLANS AND PROBLEMS



### III EDP PLANS AND PROBLEMS

#### I. PERSONNEL AVAILABILITY AND PRODUCTIVITY

- The rapidly decreasing cost of computer hardware is being complemented by increasing user demand for remote data input, processing and communications capabilities.
- The price/performance capabilities of large scale computers have tripled approximately every six years since 1954. In the twelve years from 1964 to 1976, it became possible to purchase 40 times as much on-line disk storage for the same amount of money.
- Despite the improved computer systems price/performance, expenditures for this equipment have continued to rise. With it the number and types of applications have grown, dragging along a popular misconception that data processing personnel costs are rising at an alarming rate.
  - While it is true that salary levels have been dramatically affected by inflation, total EDP expenditures for personnel, as shown earlier, are holding fast as a percentage of the total.
  - Certain industry "experts" have stated that personnel costs will represent over 90% of data processing expenditures within 20 years. INPUT believes that it is not the case and projects these costs to decline slightly as a percentage over the next decade.



- The primary reasons for this belief are increased programmer productivity through improving applications development tools, and more direct end user involvement in application development and data entry as distributed processing systems take place.
- However, this study does support the thought that the most critical problem being faced by the EDP community is that of personnel availability and productivity. This is a central "theme" that runs throughout the survey data from the 500 responses employed in this study.
  - This problem is expressed in a variety of ways ranging from outright statements such as "not enough good programmers available" to responses such as "...need to greatly improve our training programs."
- In Exhibit III-1, the three most significant problem areas (noted by 1, 2, and 3) from each industry sector are presented in matrix form:
  - As can be seen, the availability and productivity of personnel ranks overwhelmingly as the most significant problem.
  - Technical and operational needs generally occupy the second and third place problem categories in terms of the frequency of mentions.
- The remaining problem categories are also considered to reflect personnel-related areas of difficulty.
  - Lack of user involvement and lack of management involvement both represent shortened expressions of much more serious interpersonal relationships.
  - Quite often, the original survey data from which these statistics were obtained stated strongly that the user and/or management personnel were "unable to comprehend," or that they "meddled," or that the communication between the groups was "totally ineffective."

# EXHIBIT III-1

## MOST SIGNIFICANT EDP PROBLEMS

INDUSTRY SECTOR	PERSONNEL AVAILABILITY AND PRODUCTIVITY	NEED FOR OPERATIONS IMPROVEMENT (INCL. HARDWARE UPGRADE)	INADEQUATE SOFTWARE AND SYSTEMS	LACK OF USER INVOLVE- MENT IN SYSTEM/ APPL. DEVELOP.	LACK OF EFFECTIVE LONG-RANGE EDP PLANS	LACK OF MANAGEMENT INVOLVEMENT OR UNDERSTANDING	NEED FOR TRAINING AND UNDERSTANDING	INADEQUATE FUNDING OF RESOURCES
DISCRETE MANUFACTURING	1	2	3					
PROCESS MANUFACTURING		2		1	3			
TRANSPORTATION	1	2	3					
UTILITIES	1	2	3		3			
RETAIL	1	3		3	2	2		
WHOLESALE	1			3			2	
BANKING & FINANCE	1	2	3					
INSURANCE	1	3	2				3	
EDUCATION	2	1						3
OTHER	2	1			3			

NOTE: 1, 2, AND 3 REPRESENT THE FIRST, SECOND  
AND THIRD MOST SIGNIFICANT PROBLEM AREAS  
EXPRESSED BY EDP USER PANEL RESPONDENTS,  
RANKED BY THE NUMBER OF MENTIONS.

- The concern expressed by respondents over the shortage or total unavailability of effective training programs is still another indication of personnel-related problems.
  - Although only 20% of the EDP User Panel's 449 respondents replied to a question regarding vendors of education services, there is enough evidence to show that a reasonable number of companies which are not hardware vendors are now providing educational services.
  - Of the 81 responses given, Deltak, ASI, and Eductronics combined to provide more than 25% of the mentions as shown in Exhibit III-2.

## 2. APPLICATION DEVELOPMENT AND MAINTENANCE

- In analyzing the EDP/communications objectives provided by respondents, a very large percentage of the objectives mentioned (roughly 40%) involved the development of new applications and on-line applications as shown in Exhibit III-3. This compares to lower percentages given for such items as data base development, installation of mainframes and minis, operating system upgrades, improved operations, reorganization, etc.
- In support of these objectives, users are increasingly faced with decisions on how to accomplish application development most effectively. In this regard, certain background information gathered in this study provides useful planning data.
- Exhibit III-4 indicates that 15% of equipment usage and 51% of programming personnel are required for the purpose of new application development.
- Based on a \$15 million EDP/communications budget for large companies (as shown earlier in Exhibit II-1), and further assuming that about \$5 million (one-third of the total budget) is devoted to equipment costs, approximately \$750,000 annually ( $15\% \times \$5,000,000$ ) is required for equipment costs related to new application development.

## EXHIBIT III-2

### LEADING VENDORS OF EDP EDUCATION SERVICES

EDUCATION VENDOR	% MENTIONS* AS PRIMARY VENDOR
IBM	57.5%
DELTAK	12.5
ASI	8.8
HONEYWELL	6.3
EDUTRONICS	5.0
BURROUGHS	2.5
ALL OTHERS	7.4
TOTAL	100.0%

\*BASED ON 81 VALID CASES

# EXHIBIT III-3

## DEVELOPMENT OF NEW APPLICATIONS AND ON-LINE APPLICATIONS AS PERCENTAGE OF TOTAL EDP OBJECTIVES

INDUSTRY SECTOR	% OF MENTIONS BY RESPONDENTS		
	1978	1979	1980
DISCRETE MANUFACTURING	40%	37%	42%
PROCESS MANUFACTURING	37	42	36
TRANSPORTATION	35	42	67
UTILITIES	24	48	29
WHOLESALE DISTRIBUTION	36	46	44
RETAIL DISTRIBUTION	45	59	45
BANKING AND FINANCE	46	40	44
INSURANCE	47	44	38
SERVICES AND OTHER	25	50	20
AVERAGE	37%	45%	41%



## EDP RESOURCE UTILIZATION

INDUSTRY SECTOR	PERCENT OF USE.					
	COMPUTER EQUIPMENT			PROGRAMMING PERSONNEL		
	PRODUC- TION JOBS	NEW APPLI- CATION DEVELOP- MENT	EXISTING PROGRAM MAINTENANCE	NEW PROGRAM DEVELOP- MENT	EXISTING PROGRAM MAINTENANCE	
DISCRETE MANUFACTURING	67%	16%	13%	58%	40%	
PROCESS MANUFACTURING	67	16	14	54	43	
TRANSPORTATION	66	19	11	56	41	
UTILITIES	67	13	10	47	48	
WHOLESALE	74	14	11	50	43	
RETAIL	73	14	13	56	43	
BANKING & FINANCE	70	12	12	49	48	
INSURANCE	73	12	14	40	58	
EDUCATION	51	17	16	49	46	
SERVICES & OTHER	65	13	15	50	46	
AVERAGE	67%	15%	13%	51%	46%	

- Similarly, if one assumes that one-half of all EDP personnel are associated with applications programming, an additional \$1.75 million of the \$15 million total budget is required for personnel expenditures associated with new applications development.
- Further, if a pro-rata share of operations and other staff personnel are added (approximately \$200,000 annually), the total cost of new applications development reaches \$2.7 million or nearly 20% of the total \$15 million EDP budget.
- In like fashion, the burden of maintaining existing systems has serious impact on both equipment and personnel. As can be seen from Exhibit III-4, the amount of equipment utilization and personnel resources needed for this function are only slightly less than the new application development function.
  - In some industries (insurance and utilities) the personnel costs for maintenance exceed those associated with new application development.
- With more than one-third of total costs already associated with application development and maintenance and coupled with growing scarcity of qualified personnel and mounting backlogs, there can be little wonder at the increasing demand for software products and their growing popularity as an alternative for holding costs and increasing productivity.

### 3. INCREASED USE OF PURCHASED SOFTWARE PRODUCTS

- Respondents to this study were asked several questions which were attempts to quantify the popularity of software products. One of these questions was, "Are you looking for applications software to assist in implementing or developing new applications?" Exhibit III-5 summarizes the responses to this question for over 400 respondents in ten industry sectors and shows that nearly two out of three were positive.

EXHIBIT III-5

RESPONDENTS LOOKING FOR  
APPLICATIONS SOFTWARE

INDUSTRY SECTOR	NUMBER OF RESPONSES	% OF RESPONSES	
		YES	NO
DISCRETE MANUFACTURING	82	63%	37%
PROCESS MANUFACTURING	72	58	42
TRANSPORTATION	14	79	21
UTILITIES	20	75	25
WHOLESALE DISTRIBUTION	18	67	33
RETAIL DISTRIBUTION	21	71	29
BANKING AND FINANCE	47	64	36
INSURANCE	57	65	35
EDUCATION	65	65	35
SERVICES AND OTHER	6	50	50
TOTAL/AVERAGE	402	65.7%	34.3%

- Another indication of this growing trend to software products is found in the analysis of methods being used to improve the time and cost associated with the development of new applications. As indicated in Exhibit III-6, purchased software products ranked second behind on-line programming in terms of the number of mentions, and is as popular as the use of project management systems and improved training combined.
- In July 1978, INPUT completed an impact report entitled "Trends in Services and Software Pricing" as part of the Market Analysis Service (MAS) program. Included in the findings of that study were several observations appropriate to firms considering the purchase of software products:
  - Seventy-two percent of the respondents who had purchased software products had experienced increases in purchase and/or annual maintenance fees. The range was from 5-25%.
  - None of the users had shifted to other software products vendors as a result of the price increase. Although they would have liked to use alternate sources, they did not feel it was feasible for them to make the shift.
  - Users did express a captive attitude toward software products they had purchased. Over half of the respondents believed they had gotten themselves "locked-in."
  - More than 95% of the users who bought software products expected purchase price and/or annual maintenance to increase by 1980, in the range from 5-25%.
- Over half of the users stated that they conducted extensive reference checking prior to selecting outside services. This reference checking was conducted among other users and professional user groups.



**MOST POPULAR METHODS FOR IMPROVING TIME AND COST  
OF APPLICATION DEVELOPMENT**

INDUSTRY SECTOR	PERCENTAGE OF MENTIONS BY INDUSTRY SECTOR					
	ON-LINE PRO- GRAMMING	PURCHASED SOFTWARE PRODUCTS	STRUC- TURED PRO- GRAMMING METHODS	PROJECT MANAGE- MENT AND CONTROL SYSTEMS	IMPROVED TRAINING OF PERSONNEL	OTHER
DISCRETE MANUFACTURING	27%	15%	16%	17%	6%	19%
PROCESS MANUFACTURING	21	32	11	5	11	20
TRANSPORTATION	33	22	11	7	7	20
UTILITIES	28	21	10	10	4	27
WHOLESALE DISTRIBUTION	27	14	9	14	14	22
RETAIL DISTRIBUTION	18	9	18	14	5	36
BANKING AND FINANCE	16	16	12	10	14	32
INSURANCE	26	6	12	12	6	38
ALL OTHER	12	24	15	7	-	42
AVERAGE	23%	18%	13%	11%	7%	28%



- Users almost always look to the software vendors for special programs or expertise they do not possess on their own staffs. Although there is an expectation that prices will increase, there is a belief that it would still be less expensive and more timely than a comparable in-house development. Typical user comments were:

- "Software products are cheaper and available sooner."
- "We will continue to rely on software vendors. We can't afford to maintain staff in-house."
- "It is too expensive to develop in-house. We cannot find qualified people."
- "We will continue to buy and depreciate software packages."
- "We will still use outside sources for special packages."
- "We will continue to go to the firms who have special talent."
- "We plan to buy on the outside because of special technical capabilities we need."
- "It is still cheaper to use special expertise from outside. The lack of programmers is a very critical problem."

- As a measure of software product sources, Exhibit III-7 lists the top seven vendors of systems software and applications software products as provided by INPUT User Panel survey respondents.

- As shown, the concentration of vendors of systems software is much greater with more than 75% of the mentions included in the top seven systems vendors compared to less than 60% in the applications area.

# EXHIBIT III-7

## LEADING SOFTWARE VENDORS TO RESPONDENTS

SYSTEM SOFTWARE VENDORS	% MENTIONS AS MAJOR VENDOR	% MENTIONS AS SECOND VENDOR
IBM	52.3%	13.4%
CINCOM	7.1	11.9
CULLINANE	7.1	3.0
ADR	3.2	9.0
PANSOPHIC	3.2	11.9
WESTINGHOUSE	3.2	4.5
WHITLOW	1.3	7.5
ALL OTHER	22.6	38.8
TOTAL	100.0%	100. %

APPLICATION SOFTWARE VENDORS	% MENTIONS AS MAJOR VENDOR	% MENTIONS AS SECOND VENDOR
IBM	18.9%	6.1%
MSA	16.8	12.1
MCCORMACK AND DODGE	6.3	6.1
AVC	5.3	3.0
WESTINGHOUSE	4.2	9.1
ISI	3.2	6.1
INSCI	3.2	3.2
ALL OTHER	42.1	54.3
TOTAL	100.0%	100.0%

- Further, IBM's percentage as a major vendor drops from 52% in the systems software category to less than 20% in the applications software category.

#### IV SIGNIFICANT ISSUES





## IV SIGNIFICANT ISSUES

- To provide a complete assessment of all of the major issues confronting the leading users of information products and services is an effort well beyond the scope of this summary. Rather, the intent is to review those technical areas where major research has been conducted during 1978, primarily distributed data processing, data base management systems and to a lesser extent office automation.

### I. DISTRIBUTED DATA PROCESSING

- INPUT's DDP research in 1978 has served to underline the diverse perspectives that users have of the distributed data processing concept; i.e., the lack of a universal definition of DDP. Users have generally implemented distributed processing in a manner that is structured to satisfy their individual requirements.
- Although distributed processing suggests greater local control and management of the data entry and processing functions, it does not necessarily suggest increased DP autonomy at the remote site. Centralized control of equipment procurement and systems development will continue to be carried out at corporate or division headquarters.
- The status of DDP is determined by 200 responses from both the EDP User Panel and direct user contact for this study and shown in Exhibit IV-1.

# EXHIBIT IV-1

## DDP STATUS

STATUS	NUMBER OF RESPONSES	PERCENT OF TOTAL
DDP INSTALLED	16	8%
IMPLEMENTING DDP	12	6
CONSIDERING DDP	104	52
DDP NOT APPLICABLE	36	18
DON'T UNDERSTAND DDP	32	16
TOTAL	200	100%

- Fourteen percent have either implemented or are implementing DDP systems of some type. In many cases, the response indicated that these systems represent only a start toward much more widespread use of DDP.

a. DDP Network Design

- In INPUT's September 1978 study of DDP, 70% of the respondents regarded DDP network design as embodying a two level hierarchy of host and slave nodes. Only 12% of the sample were designing networks with autonomous nodes.
- In the same study, over one-half the respondents viewed DDP as a system configured around a central host computer operating with a centralized data base enabling:
  - Data entry and output processing on programmable terminals.
  - Remote minicomputers to split application processing with the host.
- The overall perspective did not support DDP as a network of computers with distributed data bases. This may result in large part from the lack of proven DBMS product offerings for smaller computers as well as most industries' strong orientation toward a centralized EDP organization.
- Certain industry groups, notably banking and distribution, appear to favor off-loading communications functions from the host computer as well as maintaining a centralized data base.
- Approximately one-third of all respondents mentioned IBM's System Network Architecture (SNA) as the network approach being considered or actively used for its DDP. However, 50% of the sample required IBM compatibility for their network architecture.

- Only 10% of the respondents relied exclusively on vendor supplied applications software. Fifty percent used applications software that was totally developed in-house and the remaining 40% used a combination of in-house and vendor supplied software.
- Approximately 50% of the total number of respondents were using a data base management system (DBMS) with IBM's IMS the predominantly installed package.

b. The DDP Decision Making Process

- There is little evidence to suggest that the DDP decision making process differs significantly from centralized processing analyses, justifications and procurement methods. However, there is more end user involvement in the analyses planning and specification phases.
- The decision to adopt DDP frequently evolves over an extended period of time. The causes of this evolution stem from:
  - A lack of user satisfaction with the delays and inaccuracies of centralized EDP.
  - A desire to reduce the rate of mainframe capacity utilization and decrease the incidence of upgrades.
- Approximately 50% of all respondents believed that the development cycle time for DDP was comparable to centralized processing with regard to the time required for:
  - Performing cost/performance trade-offs.
  - Defining the system.
  - Conducting the vendor analysis and selection.

- Performing the program development, integration and debugging.
- The DDP development cycle is complicated by several factors:
  - The nature of distributed processing makes audit trail tracking more difficult and requires a longer user training period.
  - The time required to select a DDP vendor(s) varies as a function of the perceived ability of the vendor's skill in supporting remote, geographically dispersed sites, the recognition that a network architecture commitment has been made, and the size of the perceived competitive market; i.e., there are 60-90 DDP vendors.
  - Minicomputer program development has proven to take longer than expected due to limitations in software and documentation difficulties.
- c. Expected Versus Realized Cost Savings
- DDP is widely regarded as being a cost effective data processing alternative to more traditional methods, with almost 50% of the respondents to INPUT's study on DDP claiming actual cost savings (see Exhibit IV-2).
  - Users, however, were hard pressed to provide quantitative information on the amount of realized savings, payback periods or ROI.
  - INPUT attributes this in part to the pilot or test status of many installations and the greater than expected difficulties encountered in implementing DDP systems.
- d. Allocation Of DDP Costs
- INPUT's DDP study showed that:



# EXHIBIT IV-2

## EXPECTED VS. REALIZED COST SAVINGS IN IMPLEMENTING DDP SYSTEMS

STATUS	TOTAL NUMBER OF RESPONSES	PERCENT OF TOTAL
NO SAVINGS ANTICIPATED OR REALIZED	1	2.5 %
SAVINGS ANTICIPATED AND NOT REALIZED	-	-
SAVINGS ANTICIPATED AND REALIZED	18	45.0
TOO EARLY TO TELL	5	12.5
DON'T KNOW	7	17.5
NO DATA	5	12.5
OTHER	4	10.0
<ul style="list-style-type: none"> <li>- PAPER SAVINGS ONLY</li> <li>- TRADEOFF/BREAK EVEN</li> <li>- UNDERESTIMATED COSTS</li> </ul>		
TOTAL	40	100.0%

- The labor costs of non-EDP personnel who operated remote site DDP equipment were almost universally charged to the remote facility.
- Approximately two-thirds of the respondents had dedicated communications lines between host and remote facilities charged to the host site budget. The remainder had communications costs charged to the remote site or corporate communications.
- The cost of remote site equipment in two-thirds of the cases was charged directly to the remote site.
- In more than three-fourths of the case, users were also assessed a DP management overhead charge.

e. Other Issues And Concerns

- The concept of automating the office coupled with electronic mail is generally regarded as a long-term driving force behind the growth and acceptance of DDP.
- Widespread concern was expressed over:
  - Limited communications capability of minicomputer vendors to support SDLC/SNA.
  - Ability of the telephone company (and ACS) to interface differing network standards and node requirements.
  - Need to reconcile the distribution of data with privacy and security regulations.
  - Unknowns related to Satellite Business Systems (SBS).
  - Uncertainties relating to the full cost of SNA.

- Economics of remote sites including the availability of maintenance support.

## 2. DATA BASE MANAGEMENT SYSTEMS

- Data base management systems (DBMS) have emerged as one of the most important issues in the information industry, especially at the user level where these systems are increasingly being used in applications development.
- Current users of DBMS anticipate increased use in applications going from the present level of 10% to a 1981 level of 30% of installed applications. By 1983, the forecast for DBMS installations is 30 times the current level.
- INPUT expects the emergence of massive data base storage capability in the next five years.
  - Storage techniques other than rotating disks including Charged Coupled Device (CCD) and bubble technology will be used.
  - Addressing capability of 32 bits or more will become commonplace.
  - On-line storage of 100 billion bytes of information with performance better than disk will be available.
  - By mid-1980, it will be cheaper to store information in memory than on paper.
  - Word and text processing systems will have an enormous impact on DBMS as the full integration of graphics, text and data takes place.
- This massive data base capability will be used not only for very large data bases but also for myriads of small data bases.

- A requirement to convert existing applications programs to use new technology may represent the most overwhelming impediment to effective use of such technology.
- Completed in May 1978, an INPUT study on DBMS software provided a number of pertinent insights for users and potential users of DBMS. These are provided in the following paragraphs.

a. DBMS Product Evaluation

- More than 70% of the companies with a DBMS installed reported that they had conducted extensive analyses of DBMS products before making a final decision. This is evidence that DP managers are concerned about the impact of DBMS and carefully examine alternatives on an analytic basis before making their final decisions.
- Reasons cited by the companies who did not perform extensive evaluation (less than 30%) of DBMS products were:
  - Hardware compatibility problems dictated only one or two alternatives.
  - Very few products available at the time.
  - Loyalty to their hardware manufacturer.

b. DBMS Selection

- Nearly three-quarters of respondents stated that the decision to purchase a DBMS was based on a particular application requirement. All of the applications cited required on-line capabilities.
- The problem of coordinating the evaluation of DBMS alternatives among multiple EDP installations in a large company requires particular attention.

- One firm unknowingly purchased the same package on three separate occasions.
- An alternative to installation of a DBMS in-house is to use a DBMS in conjunction with a remote computer services (RCS) vendor.
  - Since many RCS DBMS products are proprietary and cannot be brought in-house, RCS services are often used in addition to the main in-house DBMS.
  - The new on-site hardware offerings of service companies (primarily ADP and NCSS) provide DBMS systems as an integral part of the offering, thereby reducing the serious cost differential situation that traditionally has existed between in-house and RCS alternatives in large user organizations.

c. Cost Allocation

- In interviews conducted during 1978, INPUT found total DBMS investments that ranged from \$35,000 to \$5 million. This included the purchase price (or lease), training, and conversion costs.
- Highest costs are experienced in IBM IMS installations:
  - Several companies stated it took a year before programmers became proficient in the use of IMS.
  - Companies able to place a dollar value on training expenses estimated from \$15,000 to \$40,000 per IMS programmer.
  - The number of personnel required to support IMS ranged from three to ten times the number for other DBMS products.



- Three of every four respondents stated that they had to upgrade their hardware since installing a DBMS. However, only one-third attributed the upgrade directly to the DBMS.
- There is considerable evidence that despite vendor claims to the contrary, the level of programming personnel required to develop DBMS applications is quite high, with some unique problems associated with DBMS, such as the education and training required for programmers and users.

d. DBMS Status

- While development of DBMS has been largely evolutionary, growth is continuing and even accelerating. In this process, certain non-software developments are contributing.
  - Microcomputer technology is providing lower cost and smaller unit increments of intelligence and memory.
  - Emerging lower cost communications from value added network services (VANS) is making the distribution of data bases more economical.
  - The increasing use of electronic word processing is creating vast amounts of text in digital form.
  - The above factors are combining with the trend to distributed data processing.
- The next few years will see further emphasis on distributed data bases using full DBMS with increasing autonomy of each distributed location with respect to the management and manipulation of its own data. However, there will still be a requirement for central control of the various data base nodes and for consolidation of these various data bases into a high level, centralized, organizational data base.

- Both of these factors will tend to increase DBMS market size and will produce new techniques for pricing and supporting the products and applications.
- This growth also brings with it new methodology, such as the "back-end" DBMS processor for which INPUT projects a \$200 million to \$300 million market by 1983.

### 3. OFFICE AUTOMATION

- Office automation covers many aspects of the processing, verification, storage and retrieval, and transmission of information. Quite often the use of word processing equipment is analyzed as the bellwether progress in this area, so far as its penetration into the traditional EDP environment is concerned.
- INPUT did solicit information on the involvement of EDP managers in office of the future functions. A summary of the current level of participation (1978) is shown in Exhibit IV-3.
  - Data communications, as expected, is by far the most advanced area with respect to the level of involvement with an average of 88%. This is expected to increase to virtually 100% by 1983.
  - Word processing, with an overall average level of 39% at present, will also grow significantly by 1983 to an expected two-thirds. At present, transportation, retail and wholesale lag behind in this area, while utility companies indicated a 67% level of involvement.
  - Electronic mail projects have begun in only one-half of the industry sectors and appear to be further along in manufacturing than elsewhere. The overall 14% level is forecast to improve to at least 50% by 1983.
  - Video conferencing has currently not produced a high level of interest, nor will it in the next three to five years.

EXHIBIT IV-3

PERCENT OF RESPONDENTS CURRENTLY INVOLVED WITH SYSTEMS AND PROGRAMS  
RELATED TO THE OFFICE OF THE FUTURE

INDUSTRY SECTOR	ELEC- TRONIC MAIL	WORD PRO- CESSING	COPYING DUP- LICATING	DATA COMMUNI- CATION	VOICE COMMUNI- CATION	FAC- SIMILE	VIDEO CONFER- ENCE
DISCRETE MANUFACTURING	23%	35%	23%	91%	21%	28%	5%
PROCESS MANUFACTURING	17	33	22	88	30	51	6
TRANSPORTATION	0	22	37	100	50	25	12
UTILITIES	0	67	33	100	11	25	0
WHOLESALE DISTRIBUTION	11	25	22	94	11	25	0
RETAIL DISTRIBUTION	0	20	29	82	33	21	0
BANKING AND FINANCE	12	42	33	94	34	31	0
INSURANCE	8	42	23	63	4	12	0
EDUCATION	15	47	24	88	7	10	3
SERVICE AND OTHER	0	100	50	100	50	50	0
OVERALL	14%	39%	26%	88%	20%	27%	3%









1978 ANALYSIS OF EDP IN  
BANKING AND FINANCIAL

## ABOUT INPUT

### THE COMPANY

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international consulting firm. Clients include over 100 of the world's largest and most technically advanced companies.

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**1978 ANALYSIS OF EDP IN  
BANKING AND FINANCIAL**





## BANKING AND FINANCIAL

### I. INDUSTRY SECTOR OVERVIEW

- The banking and financial industry is comprised of 110,000 establishments and nearly two million people. Of these, commercial banking accounts for more than 46,000 establishments (14,700 banks and 32,000 branches) and 1.3 million employees.
- New methods and systems are leading increasingly to the development of electronic processes that will largely replace coins, currency, and checks as the most important media of economic exchange.
- As a result of the numerous changes in financial regulation and technology, competition among financial institutions continues to grow almost unabated:
  - Thrift institutions offer third-party payments and are entering new fields unrelated to housing finance.
  - Commercial banks are adopting interest-bearing demand deposits and diversifying their loan portfolios to include more consumer and mortgage loans.
  - Industrial and retailing corporations are penetrating such fields as insurance, consumer and business financing, mortgage banking and other related activities.
- With this background, financial and banking industry respondents forecast their company's growth rates to be higher than other industry sectors surveyed for this study, and generally look for higher growth than their industry is achieving.

- The importance of EDP in achieving company growth in this sector ranges from major and "couldn't be higher" to minor but nonetheless important. EDP and communications are seen as vital elements in providing effective competitive services.
- Management concerns are related to cost effectiveness and cost control issues with budgets for 1978 generally being met. Exceptions appear to exist in those cases where major conversions are cited as being in process. As with almost all respondents, this industry appears to have little concern regarding a possible recession in 1979. Only one respondent indicated that he was prepared to adjust his budget if necessary.
- Banking and finance yielded 58 responses in four different questionnaire categories, nearly 12% of the total for this report. The contributing industry groups included companies with SIC codes in the 60, 61, 62, and 67 categories. Of these, the majority were commercial banks.
- Exhibit 1-1 provides a profile summary of respondents in the banking and finance sector for companies in three size categories:
  - Twenty-eight percent of the respondents reported annual revenues (interpreted by some respondents as assets) of \$100 million or less with the average being \$39 million. This average institution employs 595 people of which 25 (4.2%) are EDP personnel, and has an annual EDP budget of \$900,000 which translates to \$36,000 per EDP employee and about \$1,500 per total company employee.
  - Almost 60% of the respondents ranged in size from \$100 million to \$1 billion. The average company in this category is \$334 million in size, employs 1,134 people of which 70 (6.2%) are involved in EDP, and has an EDP budget of \$2.1 million.
  - The largest respondents in this sector averaged \$1.6 billion in size and employ 150 EDP personnel, slightly more than 6% of the 2,400 total

# EXHIBIT I-1

## RESPONDENT PROFILE - BANKING AND FINANCE SECTOR

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	13%	59%	28%
AVERAGE ANNUAL SALES	\$39M	\$334M	\$1,610M
AVERAGE TOTAL EMPLOYEES	595	1,134	2,431
AVERAGE EDP EMPLOYEES	25	70	150
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	4.2	6.2	6.2
AVERAGE EDP BUDGET	\$.9M	\$2.1M	\$5.9M
EDP BUDGET % OF ANNUAL SALES	2.3%	0.6%	0.4%
EDP BUDGET PER EDP EMPLOYEE	\$36.0K	\$30.0K	\$39.3K
EDP BUDGET PER TOTAL EMPLOYEE	\$1.5K	\$1.9K	\$2.4K

employees. These companies reported EDP budgets which average \$5.9 million.

- Additional observations from Exhibit 1-1 include:
  - The ratio of EDP employees to total company employees in this sector is second only to insurance, as is the amount of EDP budget per total employee in all size categories.
  - No commercial banks are included in the less than \$100 million size category.
- Exhibit 1-2 provides a measure of the range of values for the ratio of EDP budget to institution size reported by respondents in this sector. The mean value for the industry is less than .5% compared to 1.27% for respondents across all industries.

## 2. BUDGET AND EXPENDITURE ANALYSIS

- EDP expenditures in the banking and finance sector will increase an average of 14% in 1979 according to respondents, but will continue at the lower rate of 11% per year through 1983. Exhibit 1-3 provides a distribution of planned budget growth for the 1978 to 1979 period.
- As a percentage of the total EDP budget, expenditures for small computers and communications will rise steadily in 1979 and 1980. During the same period, expenditures for mainframe computers, personnel, software, and miscellaneous other (supplied, forms, etc.) are forecast to decrease as a percentage as indicated in Exhibit 1-4 .
  - Based on the expected 14% budget increase for 1979, the absolute dollar expenditure in every budget category except software and non-programmable terminals will be higher.

EXHIBIT 1-2

DISTRIBUTION OF EDP BUDGET TO  
COMPANY SALES RATIOS FOR RESPONDENTS IN THE  
BANKING AND FINANCE SECTOR

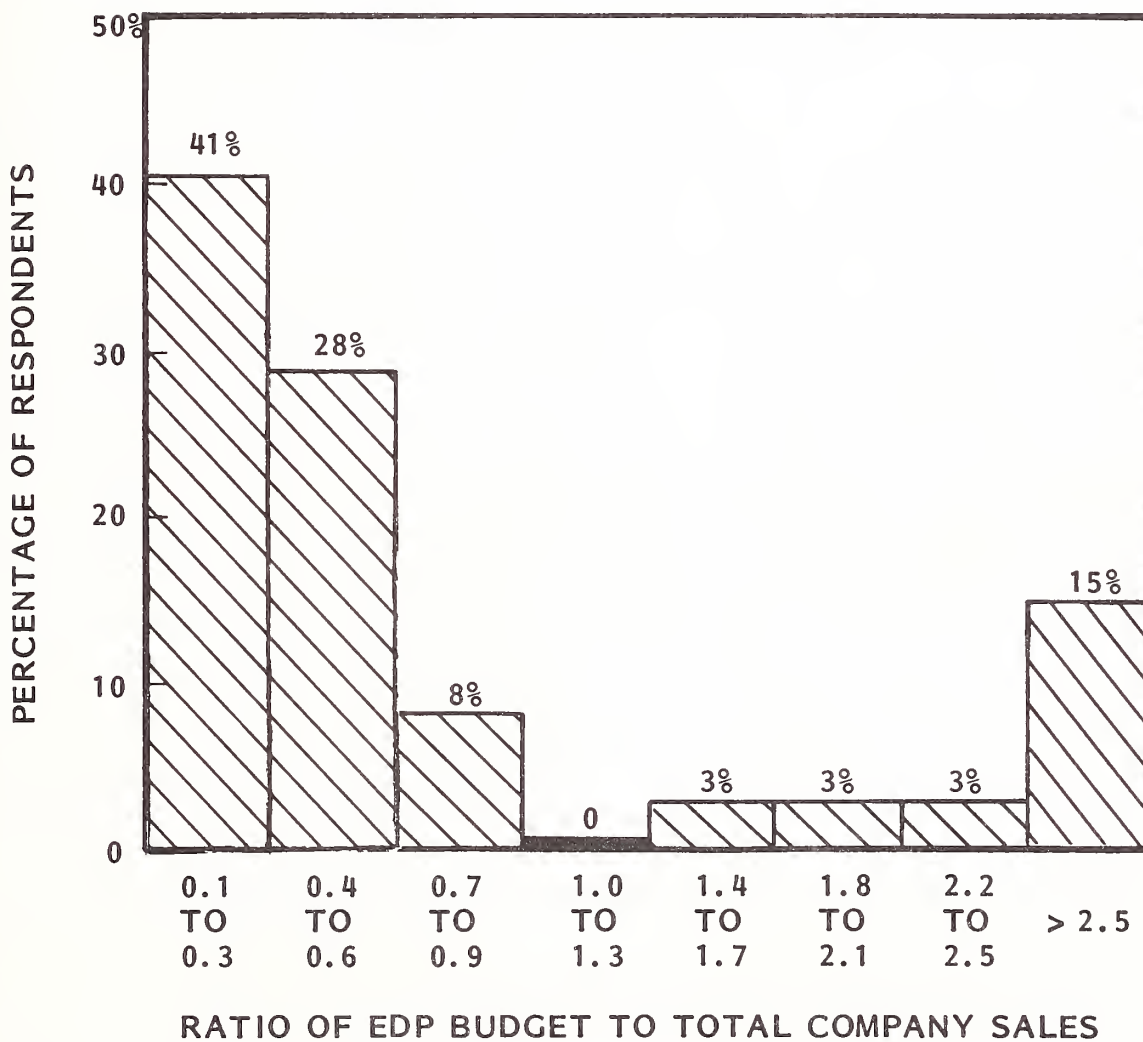
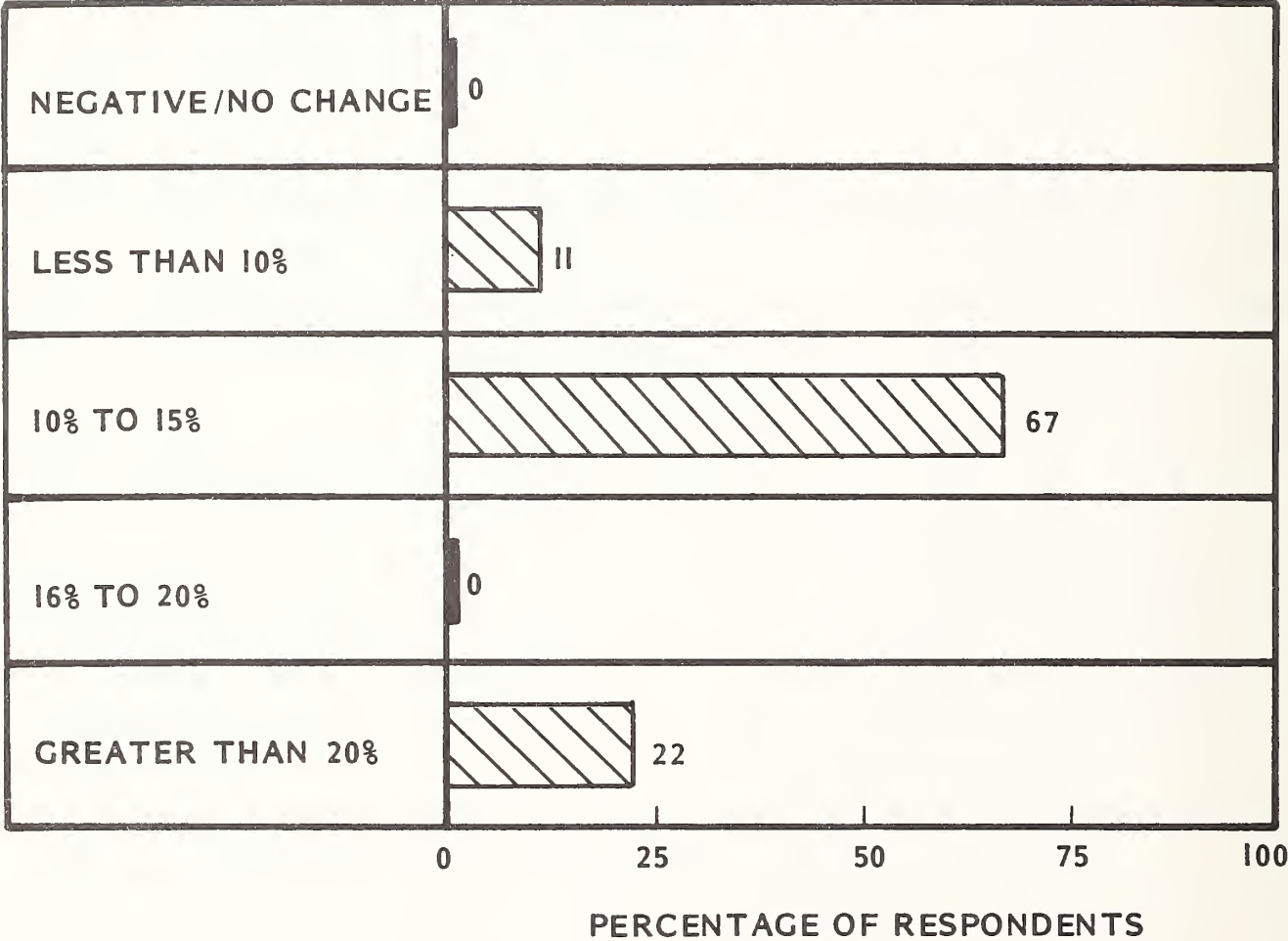




EXHIBIT I-3

1978-1979 PLANNED EDP BUDGET GROWTH  
FOR RESPONDENTS-  
BANKING AND FINANCE SECTOR



# EXHIBIT 1-4

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE BANKING AND FINANCE SECTOR

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	30%	29%	25%	(17)%
SMALL COMPUTERS / PROGRAMMABLE TERMINALS	3	4	5	67
NON-PROGRAMMABLE TERMINALS	4	3	3	(25)
COMMUNICATIONS	4	6	6	50
SOFTWARE (PURCHASE/LEASE)	5	3	3	(40)
PERSONNEL	41	40	35	(15)
OTHER	15	12	8	(47)

- Exhibit I-5 provides a measure of the continuing growth of computer services and software in the banking and finance sector as foreseen by EDP managers. As shown, significant increases are expected in 1978 for contract programming.
- It should be noted that the decline or low increase in processing services expenditures represent significant differences from previous INPUT forecasts. It is our opinion that control of most outside services purchases is not usually vested in the central EDP department (the source of most data contained in this report).
- While there is movement toward bringing computing services "in-house" which will reduce outside expenditures under EDP department control, there is still a significant increase in end user expenditure taking place as evidenced by other INPUT studies of the situation.
- Based on INPUT's annual forecast of computer services, the banking and finance sector will experience growth from 1977 to 1978 of 28% in remote computing, 12% in batch processing, 21% in software products, 30% in professional services, and 23% overall.

### 3. MAJOR PLANS AND PROBLEMS

- Study respondents who were visited or contacted by telephone for this study were asked to rank the importance of certain EDP/communications factors. As shown in Exhibit I-6, the most important factors in the banking and finance sector were personnel availability and productivity and security related.
- All respondents to this study were queried regarding major EDP objectives for 1978, 1979, and 1980. Exhibit I-7 summarizes their responses and provides a ranking based on the number of mentions for major categories.

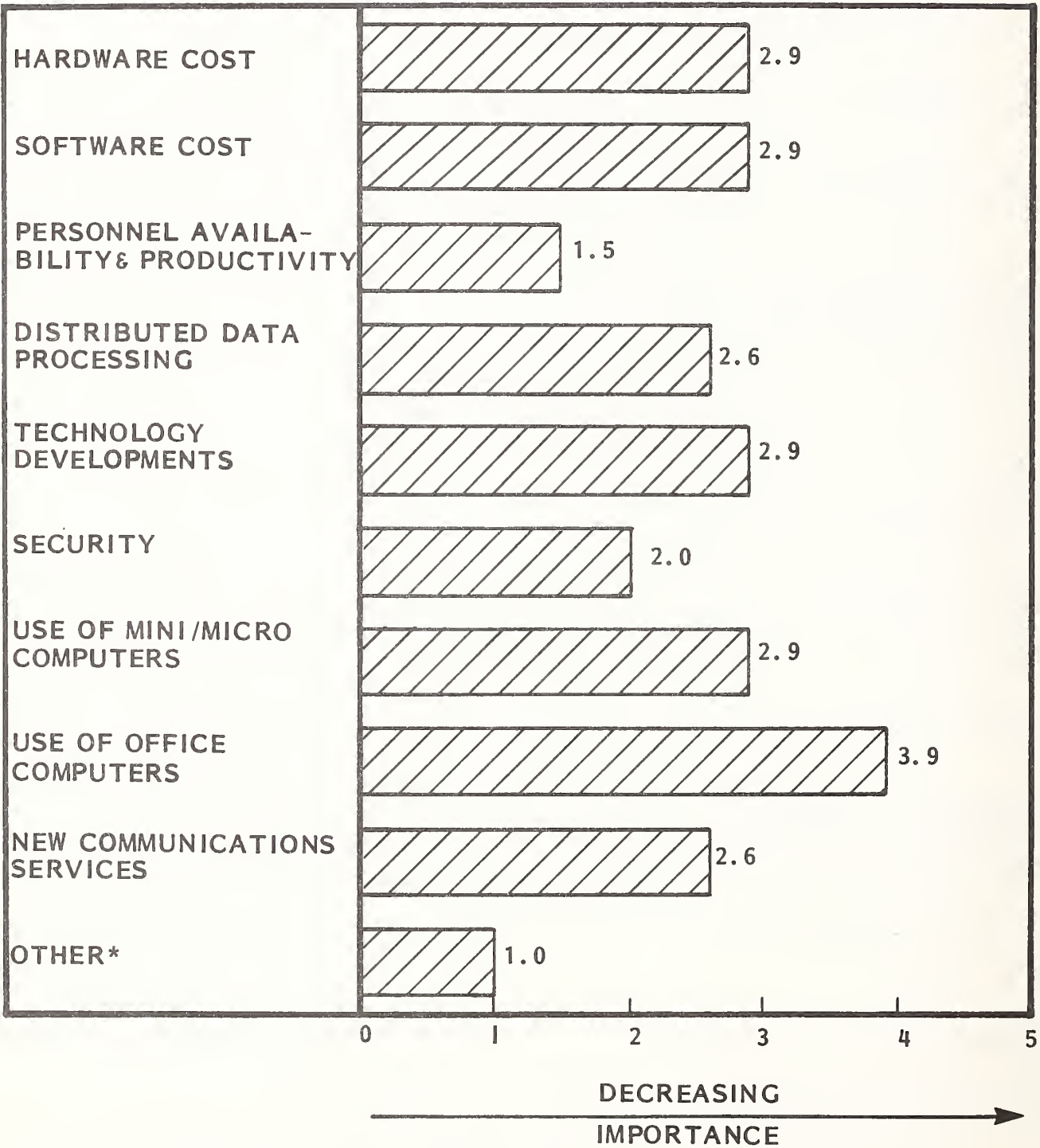
EXHIBIT I-5

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE  
BANKING AND FINANCE SECTOR

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$ 91	\$107	18 %
REMOTE BATCH	300	263	(12)
BATCH	53	40	(25)
INPUT/OUTPUT	21	21	0
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$ 50	\$ 46	(8)%
APPLICS. SOFTWARE	83	89	7
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$ 40	\$ 85	113 %
EDP CONSULTING	51	51	0
EDUCATION	15	18	20
OTHER	-	-	-
<u>FACILITIES MANAGEMENT</u>	-	-	-
<u>MAINTENANCE</u>	\$129	\$136	5 %

EXHIBIT I-6

IMPORTANCE OF EDP/COMMUNICATION FACTORS RANKED  
BY RESPONDENTS IN THE BANKING AND FINANCE SECTOR



\*SPECIFIC FACTORS MENTIONED INCLUDE:

- QUALITY OF EDP SERVICE



# EXHIBIT I-7

## EDP OBJECTIVES FOR RESPONDENTS IN THE BANKING AND FINANCE SECTOR

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	3%	8%	13%
DESIGN/INSTALL DDP	2	3	3
NEW APPLICATIONS	17	20	13
ON-LINE APPLICATIONS	29	20	31
INSTALL/UPGRADE MAINFRAME	20	20	9
INSTALL MINIS	0	0	6
INSTALL OPERATING SYSTEM	7	5	3
IMPROVE OPERATIONS	8	11	13
CENTRALIZE (OR DECENTRALIZE)	5	2	9
OTHER*	<u>9</u> 100%	<u>11</u> 100%	<u>0</u> 100%
TOTAL MENTIONS	59	61	32

### \*SPECIFIC RESPONSES INCLUDE:

- Long Range Planning
- Communications Network
- Install Word Processor

- New application development and on-line application development remained at a high level through 1980, accounting for at least 40% of all mentions.
  - The implementation of data base systems more than triples as a percentage of mentions in 1980.
  - The installation and upgrade of mainframes drops off as an objective in 1980, while the improvement of operations picks up.
- Exhibit I-8 provides an indication of the applications being planned and developed by the financial sector, together with an indication of which applications are considered to be of highest priority.
    - Contrary to other industry responses, the overwhelming majority of applications to be developed are specific to the industry.
  - Personnel availability and productivity together with the need for improved operations are considered to be the two most significant EDP problems in the banking and finance sector as shown in Exhibit I-9 .
    - This is consistent with responses given in 1976 when more than one-half of respondents cited programmer productivity as the most significant problem.
  - Similar to other industry respondents, the banking and finance sector uses as much of its equipment and application programming personnel resources maintaining existing programs as developing new ones (see Exhibit I-10 ).
  - Exhibit I-11 provides a list and a ranking of the most popular methods being used in the finance sector to reduce or improve the time and cost associated with the development of new applications.

# EXHIBIT I-8

## APPLICATIONS TO BE DEVELOPED BY RESPONDENTS IN THE BANKING AND FINANCE SECTOR

APPLICATION	PERCENT OF MENTIONS	% OF MENTIONS AS HIGHEST PRIORITY
ACCOUNTING/FINANCE	17%	13%
COST SYSTEMS	2	0
INVENTORY CONTROL	3	7
ORDER ENTRY/BILLING	1	0
PERSONNEL/PAYROLL	5	7
PURCHASING	0	0
MARKETING/SALES	2	0
MODELING/FORECASTING	1	0
COMMUNICATIONS	0	0
GRAPHICS	1	0
SCIENTIFIC/ENGINEERING	0	0
DATA BASE	9	7
ELECTRONIC MAIL	0	0
WORD PROCESSING	0	0
PERFORMANCE MEASUREMENT	0	0
OTHER* (INDUSTRY SPECIFIC)	59	66
TOTAL	100%	100%

\*SPECIFIC APPLICATIONS INCLUDE:

- Special Banking
- Loans
- Deposit
- Personal Trust
- Branch/Teller Terminals

# EXHIBIT I-9

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE BANKING & FINANCE SECTOR

ITEM	% OF MENTIONS
PERSONNEL AVAILABILITY AND PRODUCTIVITY	26%
NEED FOR IMPROVED OPERATIONS	18
INADEQUATE SYSTEMS AND SOFTWARE	17
LACK OF ADEQUATE PLANNING	9
LACK OF MANAGEMENT UNDERSTANDING OR INVOLVEMENT	5
OTHER	25
<ul style="list-style-type: none"> <li>- INADEQUATE DATA COMMUNICATIONS</li> <li>- LACK OF USER INTERACTION</li> <li>- INADEQUATE PROJECT CONTROL AND MANAGEMENT SYSTEM</li> <li>- NEED FOR IMPROVED STANDARDS AND DOCUMENTATION</li> <li>- EXCESSIVE PROGRAMMING AND PROGRAM MAINTENANCE COST</li> <li>- NEED FOR DBMS AND DDP INSTALLATION</li> </ul>	

SOURCE: EDP USER PANEL

TOTAL MENTIONS - 93

# EXHIBIT I-10

## USE OF RESOURCES- BANKING AND FINANCE SECTOR

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT : <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	70% 12 12 6 <hr/> 100%
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL: <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	49% 48 3 <hr/> 100%

### OTHER MENTIONS INCLUDE:

<sup>1</sup> RESERVE/AVAILABLE  
ADMINISTRATIVE  
ON-LINE SYSTEM  
RERUNS  
OUTSIDE SERVICES

<sup>2</sup> INSTALLATION OF PACKAGE/  
SOFTWARE  
ADMINISTRATIVE  
TRAINING  
TECHNICAL SUPPORT



# EXHIBIT I-11

## METHODS USED TO IMPROVE TIME AND COSTS ASSOCIATED WITH APPLICATIONS DEVELOPMENT - BANKING AND FINANCE SECTOR

METHOD	% OF MENTIONS
ON-LINE PROGRAMMING	16%
PURCHASED SOFTWARE	16
IMPROVED PLANNING	16
TRAINING	14
STRUCTURED METHODS	12
PROJECT MANAGEMENT SYSTEMS	10
PROGRAMMING AIDS	8
OTHER	8
- USER INVOLVEMENT	
- DOCUMENTATION	

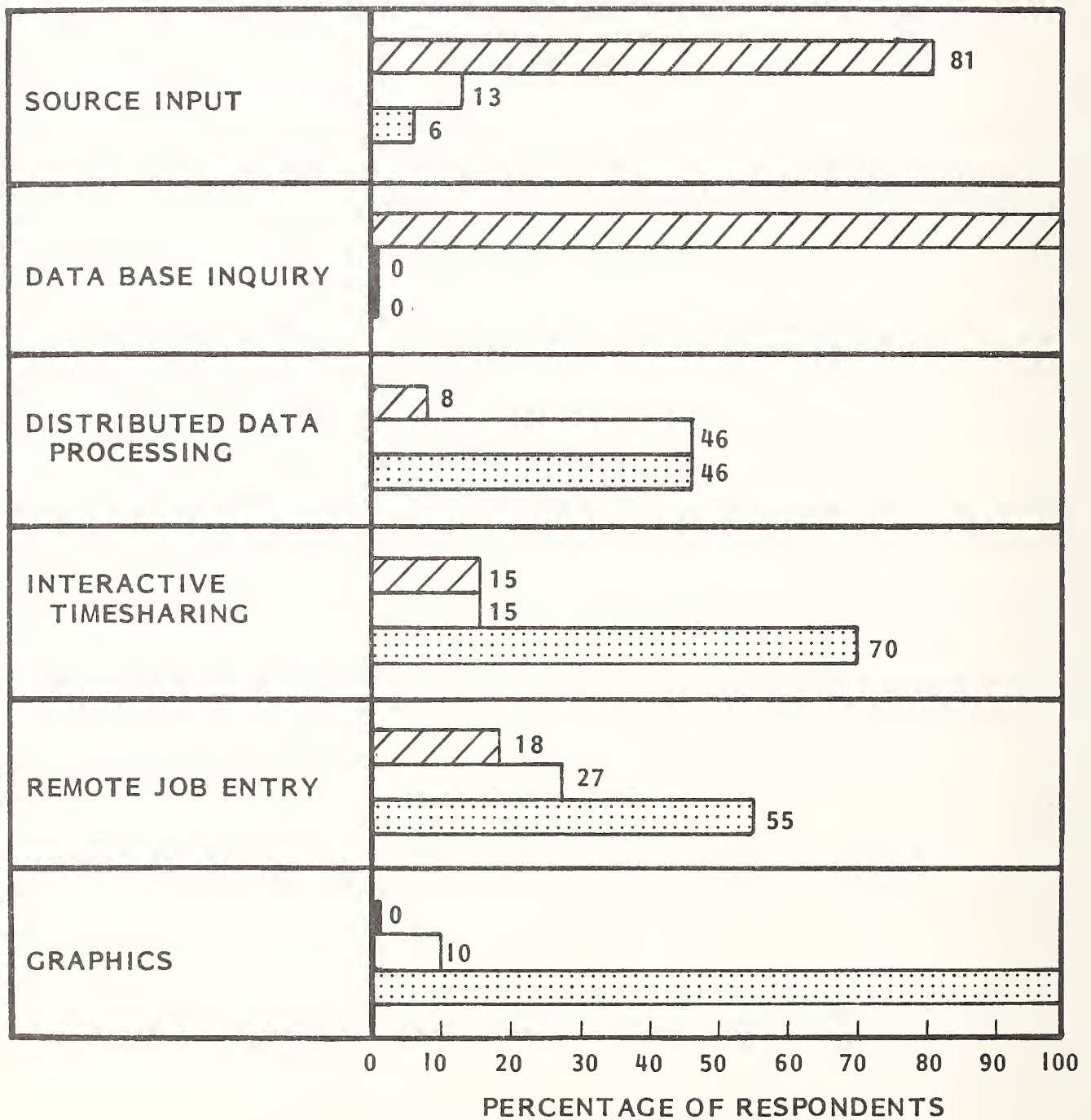
- The purchase of outside software and the use of on-line programming techniques comprise about one-third of all mentions.
- The expected increase in expenditures for communications and terminal devices through 1980 in the banking sector is clarified by analyzing the reasons for terminal installation for the same period. Exhibit I-12 provides such an analysis:
  - Eighty-one percent of respondents indicate that source data input requirements were of high importance in terms of terminal installations for the next three years.
  - All respondents stated that data base inquiry was a high importance reason for installing terminals.
  - Interactive timesharing and remote job entry have dropped to the point where more than one-half of the respondents rank these as low importance reasons for terminal installation.




#### 4. KEY ISSUE STATUS REVIEW

- Data base management systems have been installed by 56% of the 16 banking and finance respondents who answered a series of questions as shown in Exhibit I-13 . In those installations:
  - Twenty-two percent of the systems were provided by IBM, 11% by other hardware vendors, and 67% by independent software suppliers.
  - The general level of satisfaction with the DBMS system is good with only 6% of the existing installations evaluating alternatives.
  - Most of the installations were made prior to 1976.

# EXHIBIT I-12

## RELATIVE IMPORTANCE OF REASONS FOR INSTALLING TERMINALS DURING THE NEXT THREE YEARS- BANKING AND FINANCE SECTOR



-  = HIGH IMPORTANCE
-  = MEDIUM IMPORTANCE
-  = LOW IMPORTANCE

# EXHIBIT I-13

## DATA BASE MANAGEMENT SYSTEM STATUS FOR RESPONDENTS IN THE BANKING AND FINANCE SECTOR

FACTOR/CONSIDERATION IN PERCENT OF RESPONDENTS		
DBMS INSTALLED	CURRENTLY EVALUATING ALTERNATIVE DBMS	
YES 56%	YES 6%	NO 50%
NO 44%	YES 19%	NO 25%
<p>IF DBMS INSTALLED:</p> <p><u>DEVELOPER</u></p> <ul style="list-style-type: none"> <li>● IBM 22%</li> <li>● OTHER HARDWARE 11</li> <li>● INDEPENDENT 67</li> </ul> <p><u>LEVEL OF SATISFACTION</u></p> <ul style="list-style-type: none"> <li>● SATISFIED 45%</li> <li>● ACCEPTABLE 22</li> <li>● DISSATISFIED 22</li> <li>● UNKNOWN 11</li> </ul> <p><u>YEAR OF INSTALLATION</u></p> <ul style="list-style-type: none"> <li>● 1978 11%</li> <li>● 1977 0</li> <li>● 1976 22</li> <li>● 1975 22</li> <li>● EARLIER 34</li> <li>● NO ANSWER 11</li> </ul>		

- Distributed data processing systems exist in 12% of the banking and finance respondents' firms. However, 50% are considering DDP systems, and only 25% indicate that DDP is not applicable (see Exhibit I-14 ). DDP uses and intended applications for this industry sector as given by respondents include:
  - Remote processing.
  - Data entry.
- Exhibit I-15 summarizes the status of various office automation involvement areas by EDP departments in banking and finance. Not surprisingly, the highest level of participation is in the data communications area with a reasonable level of participation in word processing (74%) expected by 1983. Consistent with other industry sectors, video conferencing is not expected to be the subject of much attention.



EXHIBIT I-14

RESPONDENT INVOLVEMENT IN DISTRIBUTED DATA PROCESSING  
BANKING AND FINANCE SECTOR

RESPONSE	PERCENT OF RESPONDENTS
DISTRIBUTED DATA PROCESSING ALREADY INSTALLED	17%
DISTRIBUTED DATA PROCESSING BEING IMPLEMENTED	10
DISTRIBUTED DATA PROCESSING UNDER CONSIDERATION	50
DISTRIBUTED DATA PROCESSING NOT APPLICABLE	23
TOTAL	100%

DDP USE OR INTENDED USE:

- ON LINE
- DATA ENTRY
- REMOTE PROCESSING



# EXHIBIT I-15

## RESPONDENT INVOLVEMENT IN OFFICE AUTOMATION- BANKING AND FINANCE SECTOR

AREA OF INVOLVEMENT	PERCENT OF RESPONDENTS		
	CURRENT	BETWEEN 1978 AND 1983	NOT BY 1983
ELECTRONIC MAIL	12%	16%	72%
WORD PROCESSING	42	32	26
COPYING/DUPLICATING	33	11	56
DATA COMMUNICATIONS	94	6	-
VOICE COMMUNICATIONS	34	17	49
FACSIMILE	31	3	66
VIDEO CONFERENCING	-	7	93





1978 ANALYSIS OF EDP IN  
DISCRETE MANUFACTURING

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INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

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1978 ANALYSIS OF EDP IN  
DISCRETE MANUFACTURING



## DISCRETE MANUFACTURING

### I. INDUSTRY SECTOR OVERVIEW

- The discrete manufacturing sector, with more than 185,000 U.S. establishments and nearly 200 firms with over \$300 million in annual revenues, employs 11 million employees:
  - Total expenditures for EDP by this sector exceeded \$8.5 billion in 1977 and are expected to grow beyond \$15 billion by as early as 1982.
- Paced by industry giants including automobile, aerospace, and machinery manufacturers, the industry's growth has been exceptional in 1977 and 1978. Survey results indicate a highly positive outlook for 1979 with the majority of respondents indicating that their individual company growth will exceed overall industry growth.
- In rating the importance of EDP in accomplishing this growth, almost all respondents indicated that EDP was required or essential but of medium (rather than major or minor) importance. Specific exceptions, however, were provided by several companies with respect to the role of EDP in product development and engineering where computers do provide a perceived competitive advantage.
- Top management concerns still appear to focus on the costs associated with information systems although cost reductions are becoming less important. EDP budget plans generally have been met in 1978 with only one indication of actual performance being significantly higher than plan.
- With respect to questioning regarding contingency plans in the event of a 1979 recession, not one response provided an indication that 1979 plans included a specific allowance for this eventuality.

- The discrete manufacturing sector yielded 97 responses, about 19% of the total, for this report. The contributing industry groups included companies with SIC codes in the 23, 25, 27, 31, and 34 through 39 categories.
  - More than 50% of the responses came from companies in the machinery groups including electrical (SIC 35 and 36) and transportation equipment (SIC 37).
  - Another 25% of the responses came from companies in printing and publishing (SIC 27), fabricated metal products (SIC 34), and instruments (SIC 38).
- Exhibit I-1 provides a profile summary of EDP User Panel respondents in the discrete manufacturing sector for companies in three different size categories:
  - One-third of the companies reported annual sales of less than \$100 million with a range of \$28 million to \$81 million, and averaging \$59 million. This average company employs 1,240 personnel of which 28 (2.3%) are EDP personnel, and has an annual EDP budget of \$900,000 (1.5% of annual sales) which translates to \$32,100 per EDP employee or about \$700 per total company employee.
  - More than one half (56%) of the respondents ranged in size from \$100 million to \$1 billion in annual sales. The average company in this category is \$231 million in size, employs 4,260 people of which 68 (1.6%) are involved in EDP, and has an EDP budget of \$2.1 million which represents .9% of the company's annual sales.
  - The largest discrete manufacturing companies responding to INPUT's survey average \$3.7 billion in annual sales, and employ an average of 421 EDP personnel or about 1% of the total 40,000 employees. These companies reported EDP budgets which average \$18.7 million or about .5% of total company sales.

# EXHIBIT I-1

## RESPONDENT PROFILE - DISCRETE MANUFACTURING SECTOR

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	33%	56%	11%
AVERAGE ANNUAL SALES	\$59.2M	\$231M	\$3,680M
AVERAGE TOTAL EMPLOYEES	1,240	4,260	40,600
AVERAGE EDP EMPLOYEES	28	68	421
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	2.3	1.6	1.0
AVERAGE EDP BUDGET	\$0.9M	\$2.1M	\$18.7M
EDP BUDGET % OF ANNUAL SALES	1.5%	0.9%	0.5%
EDP BUDGET PER EDP EMPLOYEE	\$32.1K	\$30.9K	\$44.4K
EDP BUDGET PER TOTAL EMPLOYEE	\$700	\$490	\$460



- Additional observations from Exhibit I-1 include:
  - Economies of scale are achieved by larger firms in this sector both in terms of the lower ratio of EDP employees to total company employees and the lower ratio of EDP budget to total company sales.
  - These improvements suggest a measure of the economic value associated with centralized EDP operation, in that many of the smaller firms included in this analysis are known to be subsidiaries or autonomous divisions of larger companies.
  - The EDP budget per EDP employee ratio of \$44,400 for the largest respondents is thought primarily to reflect the greater investment needed by large diverse companies for huge complex systems including communications, software and remote hardware, and also the currently high amounts required for conversion and migration to new hardware and software systems.
- Exhibit I-2 provides a measure of the range of values for the ratio of EDP budget to total company sales reported by discrete manufacturing respondents. The mean value for the industry is 1.24% compared to 1.27% for respondents across all industries.

## 2. BUDGET AND EXPENDITURE ANALYSIS

- EDP expenditures in the discrete manufacturing sector will increase an average of 11.6% in 1979, according to respondents, and will continue at a slightly higher rate through 1983. Exhibit I-3 shows the distribution of their planned budget growth for the 1978 to 1979 period.
- As a percentage of the total EDP budget, expenditures for small computers, terminals, communication services and software will all increase in 1979, while expenditures for large mainframe computers and other (supplies, forms, etc.) expenditures each decline by two percentage points. The general

EXHIBIT I-2

DISTRIBUTION OF EDP BUDGET TO  
COMPANY SALES RATIOS FOR RESPONDENTS IN THE  
DISCRETE MANUFACTURING SECTOR

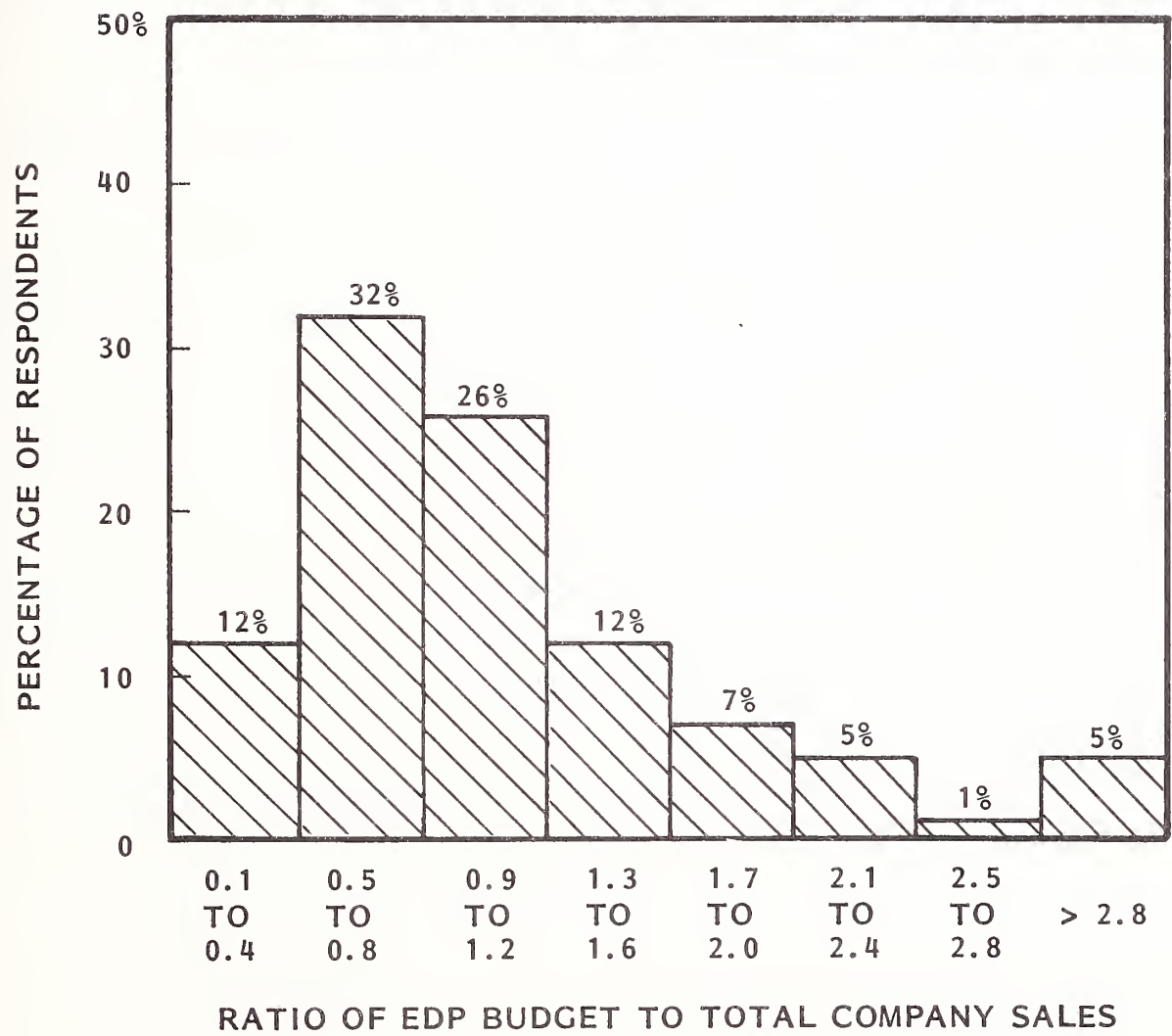
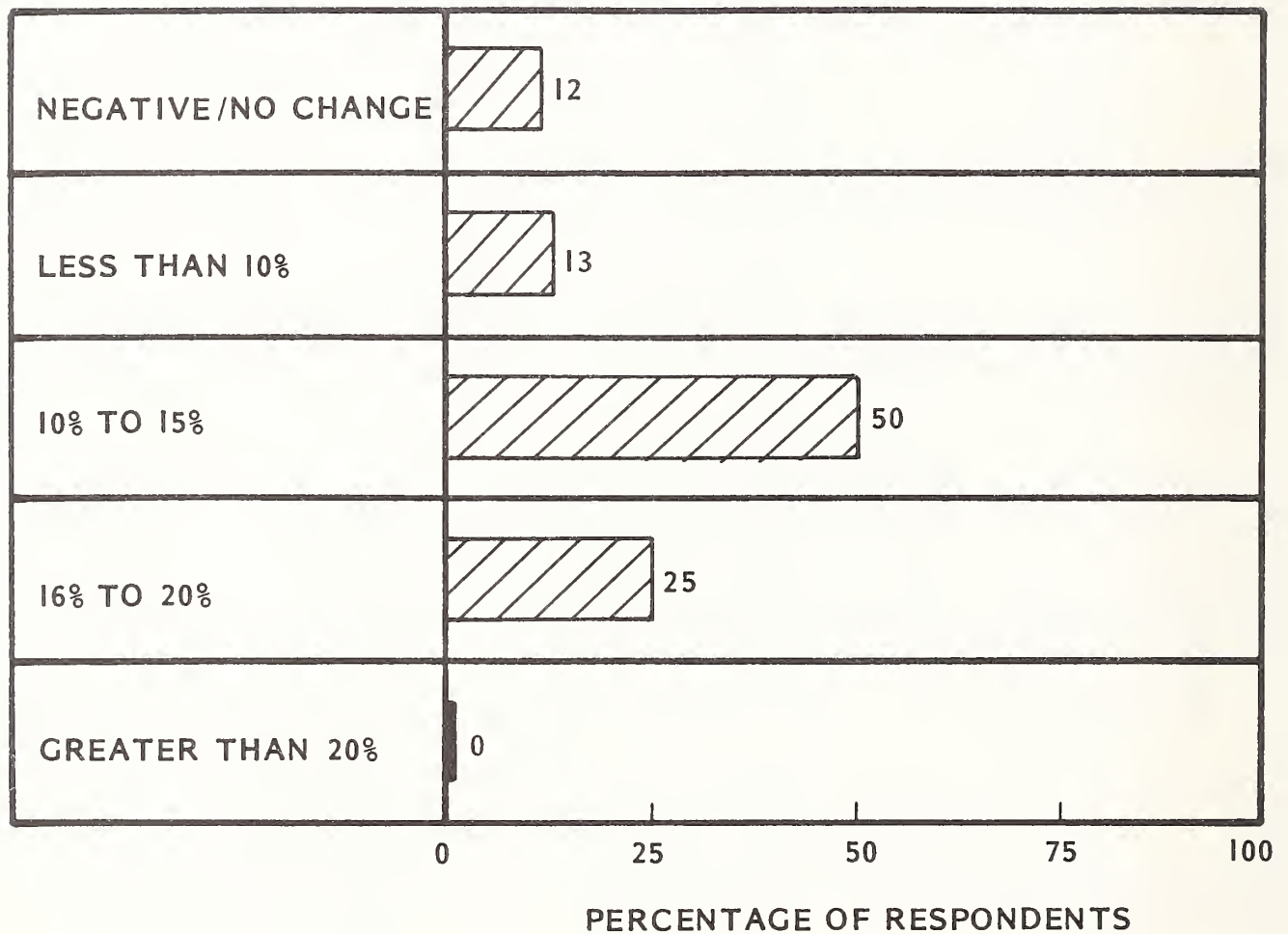


EXHIBIT I-3

1978-1979 PLANNED EDP BUDGET GROWTH  
FOR RESPONDENTS -  
DISCRETE MANUFACTURING SECTOR



indication is that this trend will continue through 1980 as indicated in Exhibit I-4 . Personnel costs as a percentage of the total are expected to remain constant over the two-year period.

- It should be noted that based on the expected 11.6% budget increase in 1979, the absolute dollar expenditure in every category will be higher although slight in the mainframe and miscellaneous other categories.
- Despite the significant declines in processing services envisioned by EDP managers shown in Exhibit I-5 , discrete manufacturing is still a major user of computer services. As indicated, significant increases are expected for 1978 in the areas of software products, education, and maintenance, reflecting the general trend observed in earlier INPUT studies.
- It should be noted that the expected declines in processing services expenditures represent significant differences from previous INPUT forecasts. It is INPUT's belief that the control of most outside services purchases is not usually vested in the central EDP department (the source of most data contained in this report).
- While there is movement toward bringing remote computing services "in-house" which results in reduction in the expenditures for outside services under EDP department control, there is still a significant increase in end user expenditure taking place as evidenced by other INPUT studies.
- As part of its 1978 study of the services industry, INPUT forecasts for discrete manufacturing show 1977 to 1978 increases of 20% for remote computer services, 16% in batch services, 23% in software products, 11% in professional services, and 18% overall.

# EXHIBIT 1-4

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE DISCRETE MANUFACTURING SECTOR

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	27%	25%	23%	(15)%
SMALL COMPUTERS / PROGRAMMABLE TERMINALS	3	5	6	100
NON-PROGRAMMABLE TERMINALS	3	4	4	33
COMMUNICATIONS	5	6	6	20
SOFTWARE (PURCHASE/LEASE)	3	4	4	33
PERSONNEL	45	45	45	0
OTHER	13	11	9	(31)



# EXHIBIT I-5

## AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$473	\$330	(30)%
REMOTE BATCH	687	277	(60)
BATCH	674	301	(55)
INPUT/OUTPUT	33	34	3
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$ 38	\$ 45	18 %
APPLICS. SOFTWARE	42	55	31
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$303	\$284	(6)%
EDP CONSULTING	167	95	(43)
EDUCATION	42	53	26
OTHER	0	6	+
<u>FACILITIES MANAGEMENT</u>	\$ 6	-	-
<u>MAINTENANCE</u>	\$ 65	\$ 89	37 %

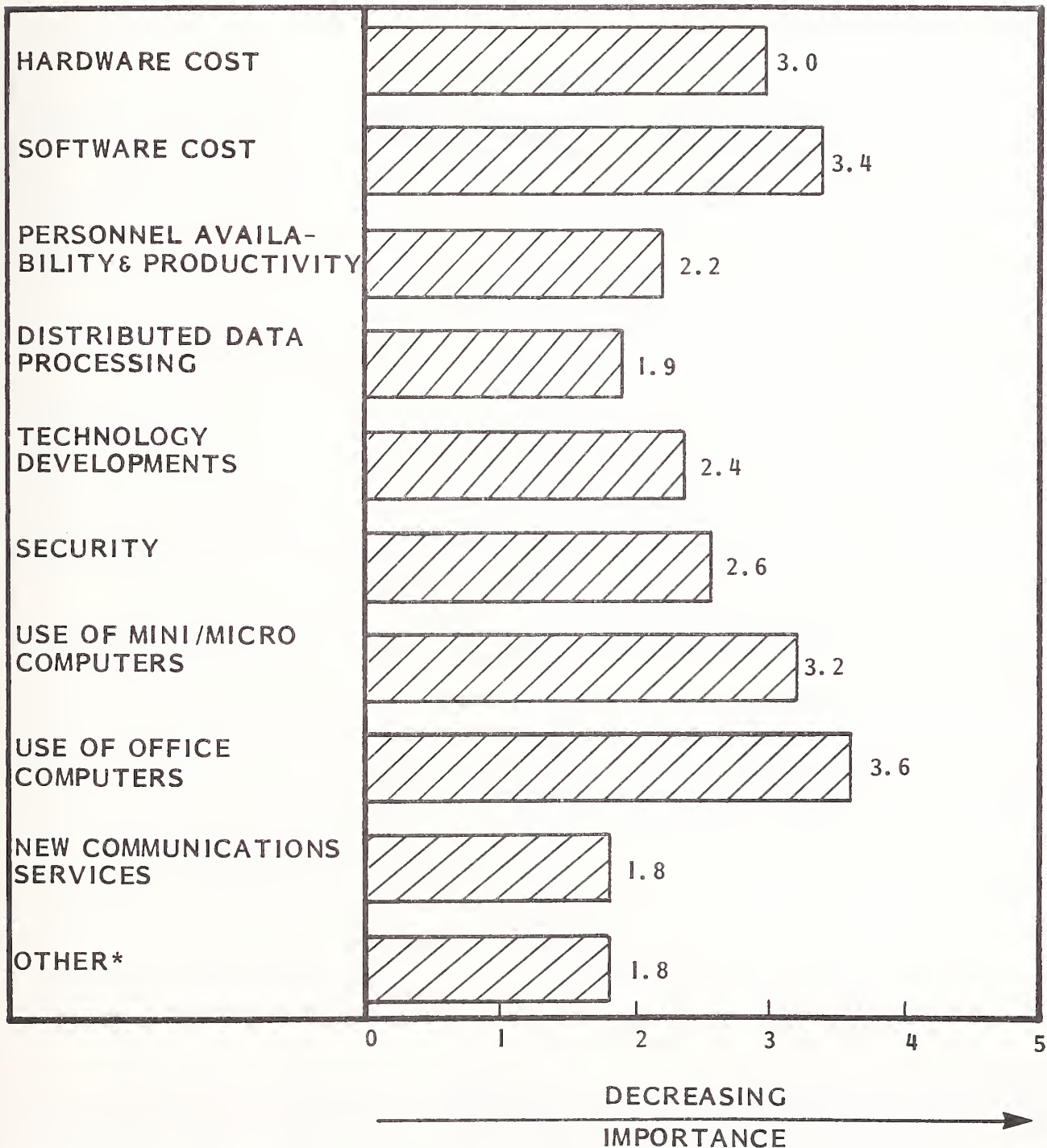


### 3. MAJOR PLANS AND PROBLEMS

- Study respondents who were visited or contacted by telephone were asked to rank the importance of certain EDP/communications factors. In every industry sector, this ranking reflected major concern over personnel availability and productivity and at least one area of technology implementation. Relatively low emphasis was placed on hardware and software cost.
- Exhibit I-6 provides a measure of the relative importance of these factors from discrete manufacturing respondents.
- All study respondents were asked to provide an indication of their highest priority EDP objectives for 1978, 1979, and 1980. Exhibit I-7 summarizes these objectives by providing a quantitative ranking (based on the number of respondent mentions) for several major categories.
  - New application development and on-line application development remained high level objectives through 1980 accounting for 40% of all mentions.
  - Hardware and software migration, while relatively high in importance in 1978, taper off by 1980 as major objectives.
  - The implementation of data base and distributed data processing systems triple as a combined percentage of mention from 1978 to 1980.
- Exhibit I-8 provides an indication of the applications being planned and developed by the discrete manufacturing sector, together with an indication of which applications are considered to be of highest priority.
  - Other than the industry specific applications, accounting/finance and order entry applications received the most mentions.

EXHIBIT 1-6

IMPORTANCE OF EDP/COMMUNICATION FACTORS RANKED  
BY RESPONDENTS IN THE DISCRETE MANUFACTURING SECTOR



\*SPECIFIC FACTORS MENTIONED INCLUDE:

- EDP ORGANIZATION
- VENDOR SERVICE

# EXHIBIT I-7

## EDP OBJECTIVES FOR RESPONDENTS IN THE DISCRETE MANUFACTURING SECTOR

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	7%	14%	12%
DESIGN/INSTALL DDP	2	8	18
NEW APPLICATIONS	23	21	20
ON-LINE APPLICATIONS	17	16	22
INSTALL/UPGRADE MAINFRAME	15	14	2
INSTALL MINIS	5	5	2
INSTALL OPERATING SYSTEM	11	3	4
IMPROVE OPERATIONS	18	11	8
CENTRALIZE (OR DECENTRALIZE)	2	4	2
OTHER*	-	4	10
	100%	100%	100%
TOTAL MENTIONS	83	74	50

\*SPECIFIC RESPONSES INCLUDE:

- International Communications
- Office of the Future

# EXHIBIT I-8

## APPLICATIONS TO BE DEVELOPED BY RESPONDENTS IN THE DISCRETE MANUFACTURING SECTOR

APPLICATION	PERCENT OF MENTIONS	% OF MENTIONS AS HIGHEST PRIORITY
ACCOUNTING/FINANCE	18%	11%
COST SYSTEMS	5	5
INVENTORY CONTROL	9	10
ORDER ENTRY/BILLING	14	24
PERSONNEL/PAYROLL	7	3
PURCHASING	6	5
MARKETING/SALES	5	5
MODELING/FORECASTING	3	0
COMMUNICATIONS	0	0
GRAPHICS	1	0
SCIENTIFIC/ENGINEERING	0	0
DATA BASE	3	0
ELECTRONIC MAIL	3	0
WORD PROCESSING	1	0
PERFORMANCE MEASUREMENT	1	2
OTHER* (INDUSTRY SPECIFIC)	24	35
TOTAL	100%	100%

\*SPECIFIC APPLICATIONS INCLUDE:

- Manufacturing
- Scheduling
- Distribution



- Order entry was given as the highest priority development 24% of the time it was mentioned.
- Financial and administrative applications received 60% of the total mentions.
- Personnel availability and productivity are considered to be the most significant problems in the discrete manufacturing sector, as shown in Exhibit I-9 . This is consistent with the responses generated by other industry sectors and is a recurring problem area throughout this report.
- The burden of maintaining existing EDP systems is having a dramatic impact on the use of resources, and on the planning for both equipment and personnel. Exhibit I-10 summarizes the reported use of resources by respondents in the discrete manufacturing sector.
  - Two thirds of the equipment utilization is devoted to production. The remaining time is almost equally divided between new application development and existing program maintenance. Assuming a 75% equipment utilization factor, this translates to approximately 20 hours per week per machine devoted to application maintenance tasks.
  - Similarly, nearly one-half of all application programmer time is devoted to the maintenance function, a difficult environment in which to reduce personnel turnover and induce a high level of motivation.
- Exhibit I-11 provides a list and a ranking of the most popular methods being used to reduce or improve the time and cost associated with the development of new applications.
  - Both on-line programming and the purchase of software products receive a high percentage of mentions, consistent with other industries.

# EXHIBIT I-9

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE DISCRETE MANUFACTURING SECTOR

ITEM	% OF MENTIONS
PERSONNEL AVAILABILITY AND PRODUCTIVITY	19%
NEED FOR OPERATIONS IMPROVEMENT (INCLUDING HARDWARE UPGRADE)	14
INADEQUATE SOFTWARE AND SYSTEMS	10
LACK OF SUFFICIENT OR CONSISTENT EDP PLAN	9
INADEQUATE STANDARDS, PROCEDURES, AND DOCUMENTATION	9
LACK OF MANAGEMENT PARTICIPATION OR UNDERSTANDING	8
OTHER	31
<ul style="list-style-type: none"> <li>- NEED FOR USER INVOLVEMENT AND TRAINING</li> <li>- INSUFFICIENT COMMUNICATIONS CAPABILITY</li> <li>- NEED FOR PROJECT CONTROL SYSTEMS</li> <li>- INADEQUATE ORGANIZATION</li> <li>- HARDWARE AND SOFTWARE CONVERSION</li> <li>- NEED FOR FASTER APPLICATION DEVELOPMENT TIME</li> <li>- INCREASING MAINTENANCE REQUIREMENTS</li> <li>- LACK OF DBMS</li> </ul>	



# EXHIBIT I-10

## USE OF RESOURCES - DISCRETE MANUFACTURING SECTOR

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT : <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	67% 16 13 4 <hr/> 100%
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL : <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	58% 40 2 <hr/> 100%

### OTHER MENTIONS INCLUDE :

<sup>1</sup>OUTSIDE SALES  
RERUNS  
ADMINISTRATIVE  
EXCESS TIME  
OPERATING SYSTEM

<sup>2</sup>USER SUPPORT  
DATA BASE  
SELF-IMPROVEMENT  
OPERATING SYSTEM

# EXHIBIT I-11

## METHODS USED TO IMPROVE TIME AND COSTS ASSOCIATED WITH APPLICATIONS DEVELOPMENT - DISCRETE MANUFACTURING SECTOR

ITEM	% OF MENTIONS
ON-LINE PROGRAMMING	22%
PROJECT MANAGEMENT AND CONTROL SYSTEMS	17
STRUCTURED PROGRAMMING	16
SOFTWARE PRODUCTS	15
OTHER	30
<ul style="list-style-type: none"> <li>- IMPROVED TRAINING</li> <li>- USER INVOLVEMENT</li> <li>- PRODUCTIVITY MEASUREMENT TOOLS</li> <li>- AUTOMATED DOCUMENTATION</li> <li>- PROGRAM DEVELOPMENT AIDS</li> </ul>	

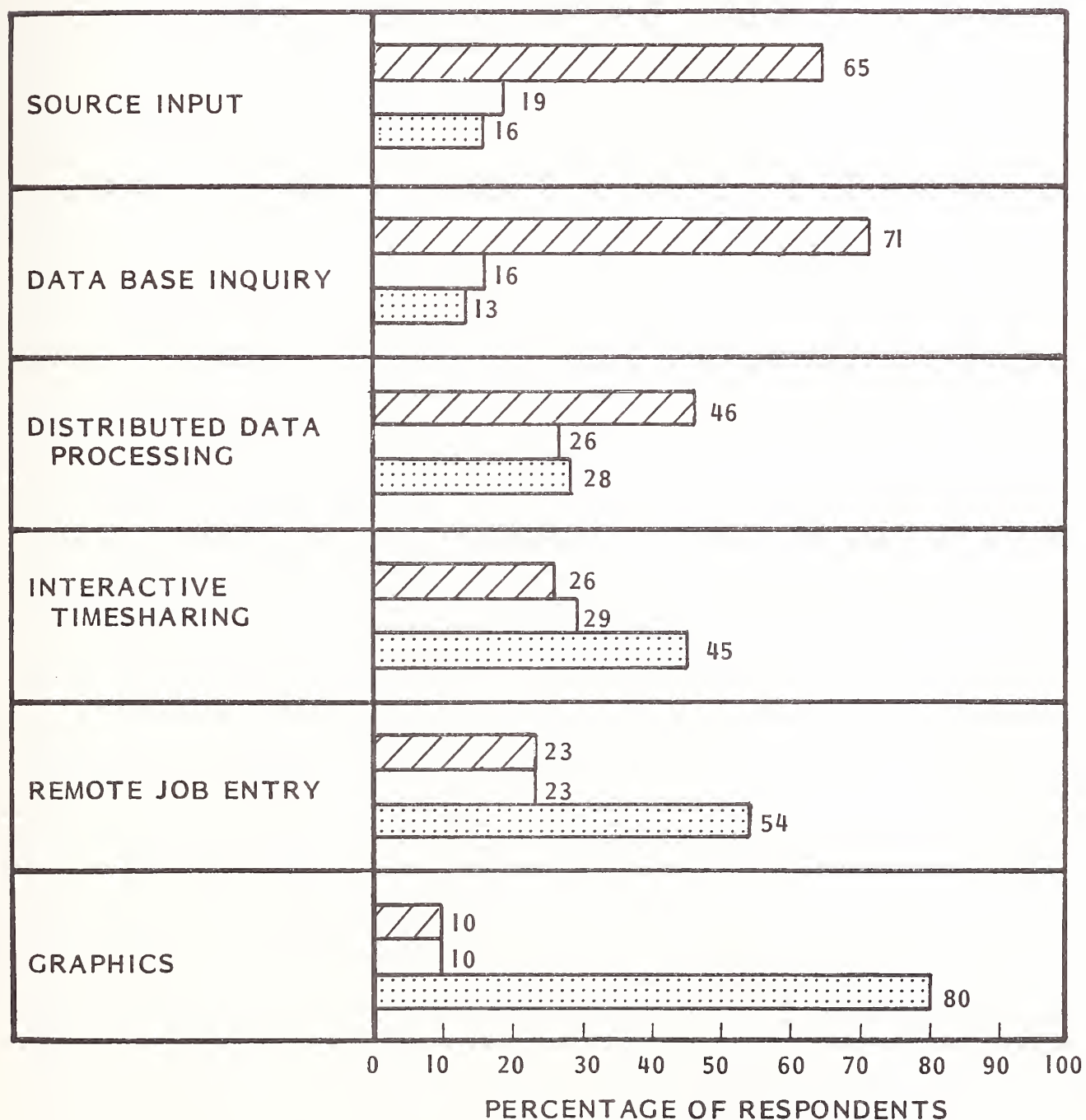
- An analysis of the discrete manufacturing sector in late 1976 indicated that an important near term objective was the installation of terminal devices for increasing the level interactive and remote computing. Exhibit I-12 indicates a shift to new application areas as being the major focus.
- Sixty-eight percent of respondents indicated that source data input requirements were of high importance in terms of terminal installations for the next three years.
- Seventy-four percent of respondents indicated that data base inquiry was of high importance for installing terminals during the next three years.
- Interactive timesharing, remote job entry and graphics are now considered to be low importance reasons for the future installation of terminals by one-half of the respondents.




#### 4. KEY ISSUE STATUS REVIEW

- Data base management systems have been installed by two-thirds of the 38 discrete manufacturing respondents (see Exhibit I-13 ) who provided answers to these questions.
- In those installations, 52% of the systems were provided by IBM, and 48% by independent software suppliers.
- The general level of satisfaction with the systems is good, but more than one-third of the respondents with installed DBMS systems are evaluating alternatives.
- Most of the installations were made since 1975.
- Distributed data processing systems have been installed by 22% of the discrete manufacturing respondents. In addition, 8% of the respondents are presently

# EXHIBIT I-12

## RELATIVE IMPORTANCE OF REASONS FOR INSTALLING TERMINALS DURING THE NEXT THREE YEARS- DISCRETE MANUFACTURING SECTOR



-  = HIGH IMPORTANCE
-  = MEDIUM IMPORTANCE
-  = LOW IMPORTANCE

## EXHIBIT I-13

DATA BASE MANAGEMENT SYSTEM STATUS FOR RESPONDENTS IN THE  
DISCRETE MANUFACTURING SECTOR

FACTOR/CONSIDERATION IN PERCENT OF RESPONDENTS		
DBMS INSTALLED	CURRENTLY EVALUATING ALTERNATIVE DBMS	
YES 66%	YES 24%	NO 42%
NO 34%	YES 18%	NO 16%

IF DBMS INSTALLED:

DEVELOPER

- IBM 52%
- OTHER HARDWARE 0
- INDEPENDENT 48

LEVEL OF SATISFACTION

- SATISFIED 52%
- ACCEPTABLE 36
- DISSATISFIED 8
- UNKNOWN 4

YEAR OF INSTALLATION

- 1978 4%
- 1977 28
- 1976 12
- 1975 12
- EARLIER 44
- NO ANSWER 0



implementing DDP systems, 53% are considering DDP, and only 17% indicate that DDP is not applicable (see Exhibit I-14 ). DDP uses and intended uses for this industry sector as provided by respondents include:

- Data entry and order processing.
  - Inventory control and production control.
  - Offloading central CPU.
  - Manufacturing applications.
  - Clerical proofing.
  - Remote processing of cost accounting.
- Exhibit I-15 summarizes the status of various office automation involvement areas by EDP departments in discrete manufacturing. As indicated, a reasonable degree of participation is expected in most areas by 1983 with the exception of video conferencing. One hundred percent participation in the data communications area is forecast by 1983, and more than 60% is expected in the word processing area.

# EXHIBIT I-14

## RESPONDENT INVOLVEMENT IN DISTRIBUTED DATA PROCESSING- DISCRETE MANUFACTURING SECTOR

RESPONSE	PERCENT OF RESPONDENTS
DISTRIBUTED DATA PROCESSING ALREADY INSTALLED	22%
DISTRIBUTED DATA PROCESSING BEING IMPLEMENTED	8
DISTRIBUTED DATA PROCESSING UNDER CONSIDERATION	53
DISTRIBUTED DATA PROCESSING NOT APPLICABLE	17
TOTAL	100%

### DDP USE OR INTENDED USE :

- REMOTE PROCESSING
- DATA ENTRY, DATA BASE
- INVENTORY CONTROL, PRODUCTION CONTROL
- MANUFACTURING APPLICATIONS
- CLERICAL PROOFING
- PROCESS ORDERS
- OFFLOAD MAIN CPU
- COST ACCOUNTING

## EXHIBIT I-15

RESPONDENT INVOLVEMENT IN OFFICE AUTOMATION -  
DISCRETE MANUFACTURING SECTOR

AREA OF INVOLVEMENT	PERCENT OF RESPONDENTS		
	CURRENT	BETWEEN 1978 AND 1983	NOT BY 1983
ELECTRONIC MAIL	23%	27%	50%
WORD PROCESSING	35	28	37
COPYING/DUPLICATING	23	12	65
DATA COMMUNICATIONS	91	9	-
VOICE COMMUNICATIONS	21	10	69
FACSIMILE	28	12	60
VIDEO CONFERENCING	5	10	85









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1978 ANALYSIS OF EDP IN  
INSURANCE



## INSURANCE

### I. INDUSTRY SECTOR OVERVIEW

- The insurance industry employs more than two million people in its 90,000 establishments counting all agents, brokers, and services.
- The life insurance business, with nearly 1,800 firms, rode the crest of the general business recovery in 1976 and sustained the momentum through 1977 and into 1978. In 1977, increased personal income helped boost new life insurance purchases 11%.
- Inflation, a particular concern to the insurance industry, is putting pressure on operating costs causing companies to intensify efforts to control expenses and increase productivity. Hence, the industry continues to stress automation to handle the rising transaction volume.
- The industry is striving also to minimize policy lapsing which significantly increases selling costs, managing paperwork, and general administration. Furthermore, special customer services are increasing in an attempt to become more sensitive to consumer complaints.
- EDP is highly centralized in insurance companies. Exposure to EDP and communications by executives in this sector is likely to be second only to banking executives, if at all.
- Insurance industry respondents indicate a growth for their companies that keeps pace with their industry.
- EDP is considered to be very important in meeting growth objectives with computer/communication systems providing a competitive advantage as well as an essential basis for service reliability.



- Management concerns about computer and communications developments have a wide range and include unavailability of personnel, price increases, speed of application implementation (reaction time to management needs), and a fragmentation of control resulting from DDP. There is not expressed concern or action being taken with respect to a possible recession in 1979. 1978 budget plans are being met and in some cases are ahead of expectation.
- Insurance industry respondents provided 64 responses in four different questionnaire categories, or 13% of the total for this report. The contributing industry groups included companies with SIC codes in the 63 and 64 categories. Of these more than 90% were life insurance firms.
- Exhibit I-1 provides a profile summary of respondents in the insurance sector for companies in three size categories:
  - Forty-five percent (29 firms) of the companies reported annual revenues of less than \$100 million, with an average of \$38 million. This average company employs 308 people of which 28 (9.1%) are EDP personnel, and has an annual EDP budget of \$700,000 (1.8% of annual revenues), which translates to \$25,000 per EDP employee and about \$2,300 for each employee in the company.
  - Fifty-three percent (34 firms) of the companies ranged in size from \$100 million to \$1 billion in annual revenues. The average company in this category is \$304 million, employs 1,640 people of which 120 (7.4%) are involved in EDP, and has an EDP budget of \$3.9 million, which represents 1.3% of the company's annual revenues.
  - The largest firm is \$1.8 billion in size and employs nearly 900 EDP employees, about 15% of the company's total of 5,900. This company's EDP budget is \$30 million or about 1.7% of the annual revenue.
- The insurance industry's ratio of EDP expenditures per total company employees is the highest for any sector analyzed in this report.

# EXHIBIT I-1

## RESPONDENT PROFILE - INSURANCE SECTOR

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	45%	53%	2%
AVERAGE ANNUAL SALES	\$38M	\$304M	\$1,800M
AVERAGE TOTAL EMPLOYEES	308	1,639	5,933
AVERAGE EDP EMPLOYEES	28	121	895
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	9.1	7.4	15.1
AVERAGE EDP BUDGET	\$0.7M	\$3.9M	\$30.0M
EDP BUDGET % OF ANNUAL SALES	1.8%	1.3%	1.7%
EDP BUDGET PER EDP EMPLOYEE	\$25.0K	\$32.2K	\$33.5K
EDP BUDGET PER TOTAL EMPLOYEE	\$2.3K	\$2.4K	\$5.1K

- Exhibit I-2 provides a measure of the range of values for the ratio of EDP budget to total company revenues reported by the insurance industry respondents. The mean value for the sector is 1.5% compared to 1.27% for respondents across all industries.

## 2. BUDGET AND EXPENDITURE ANALYSIS

- EDP expenditures in the insurance sector will increase an average of 12.5% in 1979 according to respondents, but will continue at a slightly lower rate of 11.6% through 1983. Exhibit I-3 provides a distribution of planned budget growth for the 1978 to 1979 period.
- As a percentage of the total EDP budget, expenditures for small computers, terminals, and communications will rise steadily in 1979 and 1980. During the same period, expenditures for mainframe computers, personnel, and miscellaneous other (supplies, forms, etc.) are forecast to decrease as a percentage as indicated in Exhibit I-4. Software expenditures will hold even.
  - Based on the expected 12.5 budget increase for 1979, the absolute dollar expenditure in every budget category will be higher.
- Exhibit I-5 provides a measure of the continuing growth of computer services and software in the process manufacturing sector as foreseen by EDP managers. As shown, significant increases are expected in 1978 for remote batch services and applications software.
  - It should be noted that the decline or low increase in processing services expenditures represent significant differences from previous INPUT forecasts. It is INPUT's opinion that control of most outside services purchases is not usually vested in the central EDP department (the source of most data contained in this report).

## EXHIBIT I-2

### DISTRIBUTION OF EDP BUDGET TO COMPANY SALES RATIOS FOR RESPONDENTS IN THE INSURANCE SECTOR

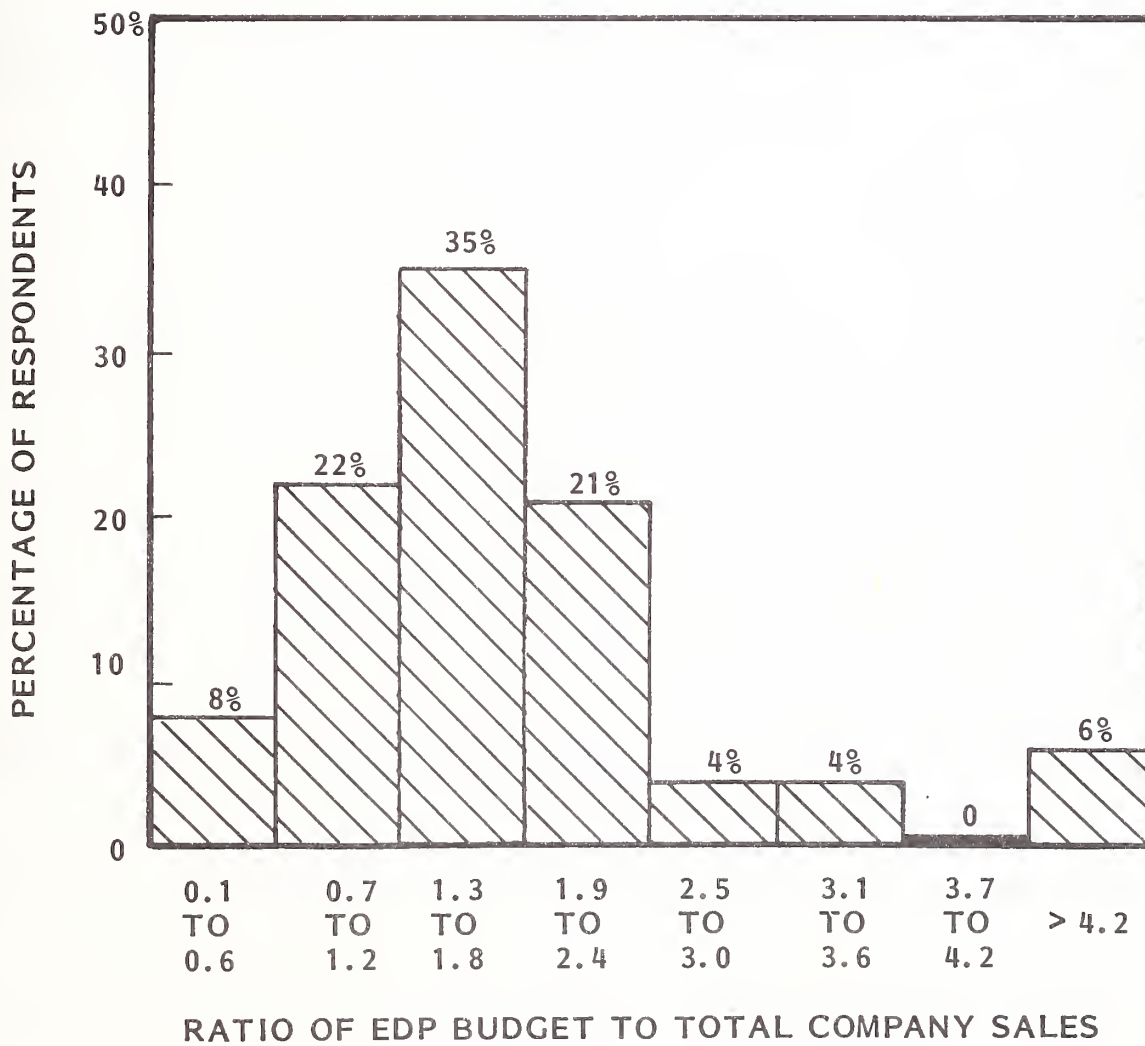
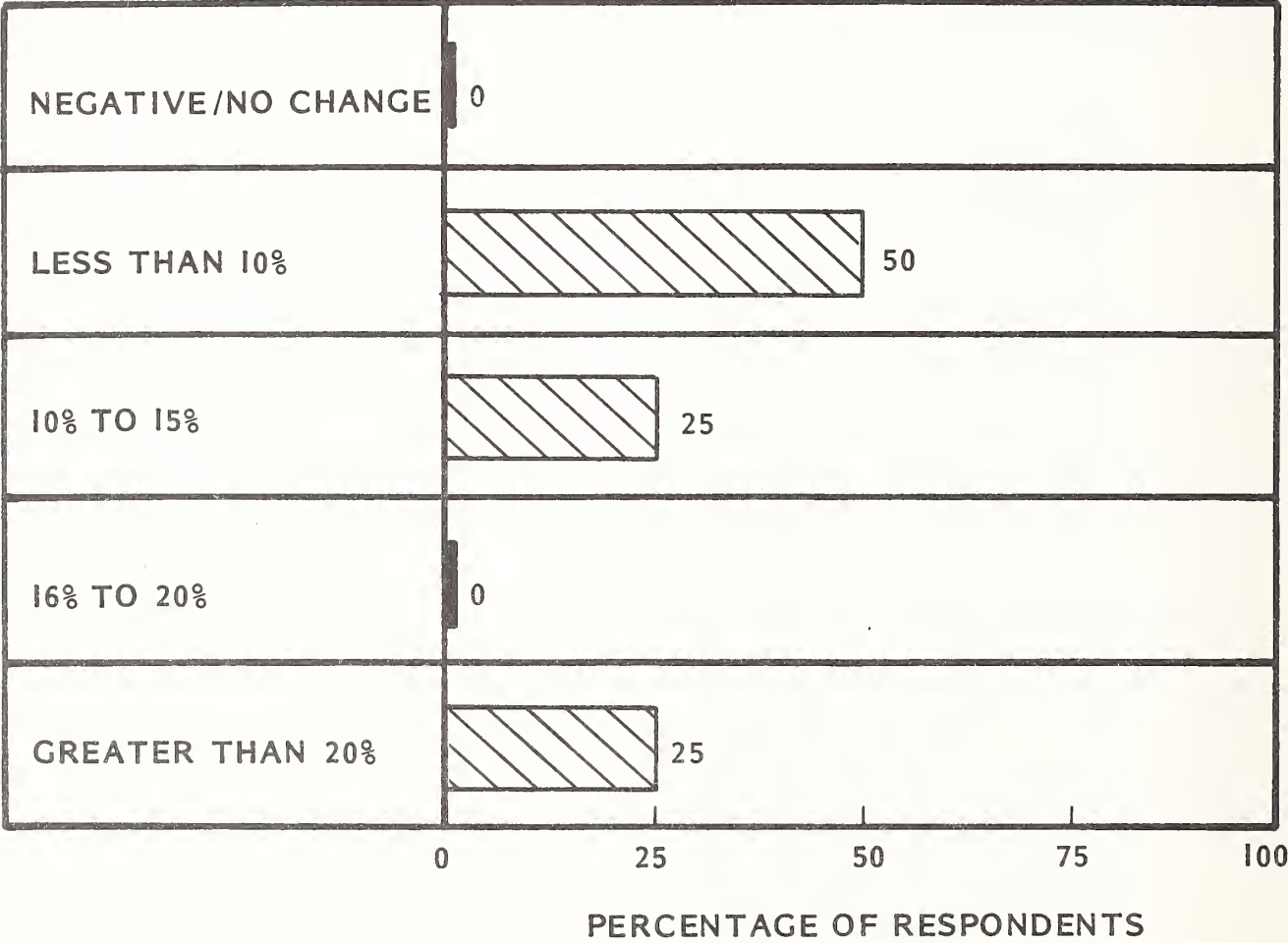


EXHIBIT I-3

1978-1979 PLANNED EDP BUDGET GROWTH  
FOR RESPONDENTS-  
INSURANCE SECTOR





# EXHIBIT I-4

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE INSURANCE SECTOR

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	26%	24%	21%	(19)%
SMALL COMPUTERS / PROGRAMMABLE TERMINALS	1	3	3	200
NON-PROGRAMMABLE TERMINALS	3	3	4	33
COMMUNICATIONS	2	3	4	100
SOFTWARE (PURCHASE/LEASE)	5	5	5	0
PERSONNEL	48	50	47	(2)
OTHER	13	11	9	(30)



# EXHIBIT I-5

## AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE INSURANCE SECTOR

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$ 34	\$ 23	(32)%
REMOTE BATCH	113	312	176 %
BATCH	15	14	(7)
INPUT/OUTPUT	110	100	(9)
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$ 32	\$ 40	25 %
APPLICS. SOFTWARE	57	81	42
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$127	\$147	16 %
EDP CONSULTING	22	19	(14)
EDUCATION	28	34	21
OTHER	-	-	-
<u>FACILITIES MANAGEMENT</u>	\$241	\$241	0 %
<u>MAINTENANCE</u>	\$ 95	\$117	23 %

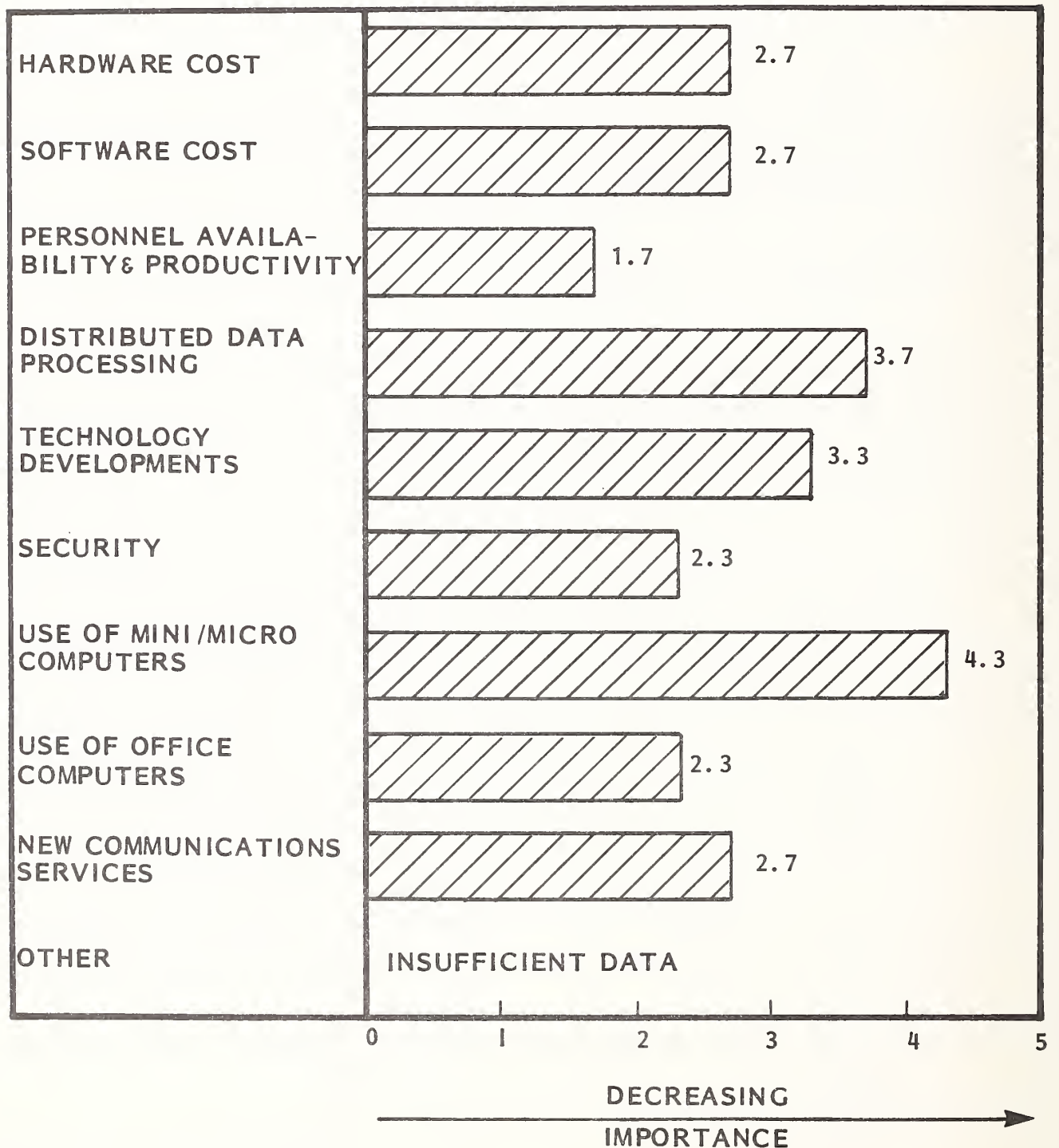
- While there is movement toward bringing interactive computing services "in-house" which will reduce outside expenditure under EDP department control, there is still a significant increase in end user expenditure taking place as evidenced by other INPUT studies of the situation.
- Based on INPUT's annual forecast for the computer services industry, 1978 expenditures in the insurance sector are expected to increase 23% for remote computing services, 21% for software products, 21% for professional services, and 16% overall.

### 3. MAJOR PLANS AND PROBLEMS

- Study respondents who were visited or contacted by telephone for this study were asked to rank the importance of certain EDP/communications factors. As shown in Exhibit 1-6 the most important factors in the insurance sector were personnel availability and productivity.
- All respondents to this study were queried regarding major EDP objectives for 1978, 1979, and 1980. Exhibit 1-7 summarizes their responses and provides a ranking based on the number of mentions for major categories:
  - New application development and on-line application development remained at a high level through 1980, accounting for nearly 40% of all mentions.
  - The implementation of data base and distributed data processing systems more than triples as a combined percentage of mention in 1980.
  - The installation and upgrade of mainframes declines as an objective in 1980.

# EXHIBIT I-6

## IMPORTANCE OF EDP/COMMUNICATION FACTORS RANKED BY RESPONDENTS IN THE INSURANCE SECTOR



# EXHIBIT I-7

## EDP OBJECTIVES FOR RESPONDENTS IN THE INSURANCE SECTOR

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	5%	11%	13%
DESIGN/INSTALL DDP	3	12	17
NEW APPLICATIONS	18	18	17
ON-LINE APPLICATIONS	29	26	21
INSTALL/UPGRADE MAINFRAME	23	8	11
INSTALL MINIS	0	2	4
INSTALL OPERATING SYSTEM	5	6	4
IMPROVE OPERATIONS	9	5	4
CENTRALIZE (OR DECENTRALIZE)	2	2	0
OTHER*	6 100%	10 100%	9 100%
TOTAL MENTIONS	65	65	52

\*SPECIFIC RESPONSES INCLUDE:

- Communications Network

- Exhibit 1-8 provides an indication of the applications being planned and developed by the insurance sector, together with an indication of which applications are considered to be of highest priority.
  - As in the case of banking and finance, industry specialized applications rank highest both in the number of mentions and the level of priority.
- Personnel availability and productivity are considered to be the most significant EDP problems in the insurance sector as shown in Exhibit 1-9 .
- Contrary to other industry respondents, the sector uses more of its equipment and application programming personnel resources for maintaining existing programs than developing new ones (see Exhibit 1-10 ).
- Exhibit 1-11 provides a list and a ranking of the most popular methods being used in the insurance sector to reduce or improve the time and cost associated with the development of new applications.
  - The use of on-line programming techniques comprise more than 25% of all mentions.
- The expected increase in expenditures for communications and terminal devices through 1980 in the sector is clarified by analyzing the reasons for terminal installation for the same period. Exhibit 1-12 provides such an analysis:
  - Ninety percent of respondents indicate that source data input requirements were of high importance in terms of terminal installations for the next three years.
  - Approximately three-quarters of all respondents stated that data base inquiry was a high importance reason for installing terminals.



# EXHIBIT I-8

## APPLICATIONS TO BE DEVELOPED BY RESPONDENTS IN THE INSURANCE SECTOR

APPLICATION	PERCENT OF MENTIONS	% OF MENTIONS AS HIGHEST PRIORITY
ACCOUNTING/FINANCE	15%	11%
COST SYSTEMS	1	0
INVENTORY CONTROL	2	0
ORDER ENTRY/BILLING	2	3
PERSONNEL/PAYROLL	7	0
PURCHASING	0	0
MARKETING/SALES	5	3
MODELING/FORECASTING	1	0
COMMUNICATIONS	0	0
GRAPHICS	0	0
SCIENTIFIC/ENGINEERING	1	0
DATA BASE	8	0
ELECTRONIC MAIL	0	0
WORD PROCESSING	0	0
PERFORMANCE MEASUREMENT	0	0
OTHER* (INDUSTRY SPECIFIC)	58	83
TOTAL	100%	100%

\*SPECIFIC APPLICATIONS INCLUDE:

- Special Insurance
- Underwriting Control
- Claims



# EXHIBIT I-9

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE INSURANCE SECTOR

ITEM	% OF MENTIONS
PERSONNEL AVAILABILITY AND PRODUCTION	23%
INADEQUATE SYSTEMS AND SOFTWARE	12
NEED FOR EDUCATION AND TRAINING PROGRAM	11
NEED FOR OPERATIONS IMPROVEMENT	11
INADEQUATE PLANNING	8
LACK OF USER INVOLVEMENT	8
NEED FOR IMPROVED STANDARDS, PROCEDURES, AND DOCUMENTATION	6
OTHER	21
<ul style="list-style-type: none"> <li>- INADEQUATE DATA COMMUNICATIONS</li> <li>- NEED FOR PROJECT MANAGEMENT AND CONTROL SYSTEM</li> <li>- DIFFICULTY AND COST OF PROGRAM MAINTENANCE</li> <li>- LACK OF MANAGEMENT INVOLVEMENT</li> <li>- EXCESSIVE SYSTEM DEVELOPMENT TIME</li> <li>- LACK OF DBMS APPROACH</li> <li>- EXCESSIVE STATE AND FEDERAL REGULATION</li> <li>- INAPPROPRIATE ORGANIZATION</li> </ul>	

SOURCE: EDP USER PANEL

TOTAL MENTIONS = 99

# EXHIBIT I-10

## USE OF RESOURCES- INSURANCE SECTOR

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT : <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	73% 12 14 1 <hr/> 100%
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL: <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	40% 58 2 <hr/> 100%

### OTHER MENTIONS INCLUDE:

<sup>1</sup>SYSTEMS UPDATE  
EQUIPMENT MAINTENANCE

<sup>2</sup>SOFTWARE  
TRAINING AND NON-PROGRAMMING  
EDUCATION  
SPECIAL REPORTS

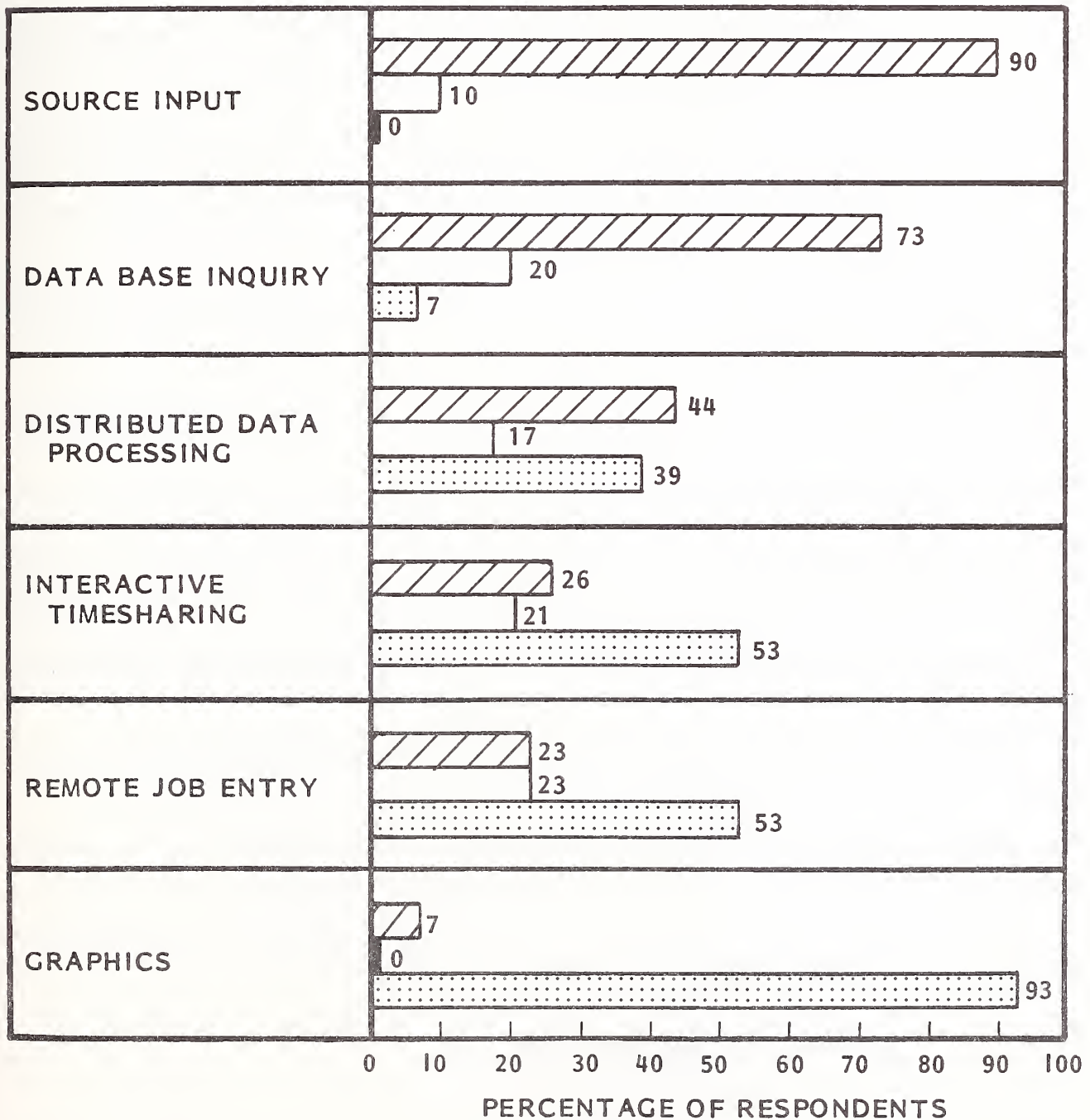
# EXHIBIT I-11




## METHODS USED TO IMPROVE TIME AND COSTS ASSOCIATED WITH APPLICATIONS DEVELOPMENT- INSURANCE SECTOR

METHOD	% OF MENTIONS
ON-LINE PROGRAMMING	26%
STRUCTURED PROGRAMMING METHODS	12
PROJECT MANAGEMENT SYSTEMS	12
PERFORMANCE STANDARDS AND DOCUMENTATION	10
PROGRAMMER PRODUCTIVITY AIDS	8
PURCHASED SOFTWARE	6
HARDWARE UPGRADE	6
TRAINING	6
OTHER	14
<ul style="list-style-type: none"> <li>- BETTER ORGANIZATION</li> <li>- DATA BASE MANAGEMENT</li> <li>- IMPROVED SYSTEM DESIGN METHODS</li> <li>- CHARGEBACK SYSTEM</li> </ul>	

# EXHIBIT I-12

## RELATIVE IMPORTANCE OF REASONS FOR INSTALLING TERMINALS DURING THE NEXT THREE YEARS- INSURANCE SECTOR



-  = HIGH IMPORTANCE
-  = MEDIUM IMPORTANCE
-  = LOW IMPORTANCE

- Interactive timesharing and remote job entry have dropped to the point where more than one-half of the respondents rank these as low importance reasons for terminal installation.

#### 4. KEY ISSUE STATUS REVIEW

- Data base management systems have been installed by 38% of the insurance respondents as shown in Exhibit I-13 . In those installations:
  - Fifty percent of the system was provided by IBM, 17% by other hardware vendors, and 33% by independent software suppliers.
  - The general level of satisfaction with the DBMS system is good with some dissatisfaction.
  - Most of the installations were made since 1976.
- Distributed data processing systems exist in 17% of the insurance industry respondent's firms. In addition, 10% of the respondents are presently implementing DDP systems, 50% are considering DDP systems, and only 23% indicate that DDP is not applicable (see Exhibit I-14 ). DDP uses and intended applications for this industry sector as given by respondents include:
  - Claims processing and payment.
  - Data entry.
  - Order processing.
  - Remote processing.



# EXHIBIT I-13

## DATA BASE MANAGEMENT SYSTEM STATUS FOR RESPONDENTS IN THE INSURANCE SECTOR

FACTOR/CONSIDERATION IN PERCENT OF RESPONDENTS		
DBMS INSTALLED	CURRENTLY EVALUATING ALTERNATIVE DBMS	
YES 38%	YES 9%	NO 29%
NO 62%	YES 22%	NO 40%
<p>IF DBMS INSTALLED:</p> <p><u>DEVELOPER</u></p> <ul style="list-style-type: none"> <li>● IBM 50%</li> <li>● OTHER HARDWARE 17</li> <li>● INDEPENDENT 33</li> </ul> <p><u>LEVEL OF SATISFACTION</u></p> <ul style="list-style-type: none"> <li>● SATISFIED 50%</li> <li>● ACCEPTABLE 25</li> <li>● DISSATISFIED 17</li> <li>● UNKNOWN 8</li> </ul> <p><u>YEAR OF INSTALLATION</u></p> <ul style="list-style-type: none"> <li>● 1978 17%</li> <li>● 1977 17</li> <li>● 1976 25</li> <li>● 1975 8</li> <li>● EARLIER 25</li> <li>● NO ANSWER 8</li> </ul>		



# EXHIBIT I-14

## RESPONDENT INVOLVEMENT IN DISTRIBUTED DATA PROCESSING- INSURANCE SECTOR

RESPONSE	PERCENT OF RESPONDENTS
DISTRIBUTED DATA PROCESSING ALREADY INSTALLED	17%
DISTRIBUTED DATA PROCESSING BEING IMPLEMENTED	10
DISTRIBUTED DATA PROCESSING UNDER CONSIDERATION	50
DISTRIBUTED DATA PROCESSING NOT APPLICABLE	23
TOTAL	100%

- Exhibit I-15 summarizes the status of various office automation involvement areas by EDP departments in the insurance industry. Not surprisingly, the highest level of participation is in the data communications area with a reasonable level of participation in word processing and electronic mail expected by 1983. Consistent with other industry sectors, video conferencing is not expected to be the subject of much attention.

# EXHIBIT I-15

## RESPONDENT INVOLVEMENT IN OFFICE AUTOMATION- INSURANCE SECTOR

AREA OF INVOLVEMENT	PERCENT OF RESPONDENTS		
	CURRENT	BETWEEN 1978 AND 1983	NOT BY 1983
ELECTRONIC MAIL	8%	46%	46%
WORD PROCESSING	42	27	31
COPYING/DUPLICATING	23	12	65
DATA COMMUNICATIONS	63	30	7
VOICE COMMUNICATIONS	4	24	72
FACSIMILE	12	16	72
VIDEO CONFERENCING	-	4	96





1978 ANALYSIS OF EDP IN  
PROCESS MANUFACTURING



## ABOUT INPUT

### THE COMPANY

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international consulting firm. Clients include over 100 of the world's largest and most technically advanced companies.

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1978 ANALYSIS OF EDP IN  
PROCESS MANUFACTURING



## PROCESS MANUFACTURING

### I. INDUSTRY SECTOR OVERVIEW

- The process manufacturing sector is comprised of over 140,000 United States establishments with 8 million employees. This sector contains approximately 300 firms with annual sales exceeding \$300 million.
  - The chemicals and allied products industry is expected to reach \$123 billion in 1978, 10% over 1977.
  - Agricultural Chemicals with \$2.9 billion in shipments in 1977 is expecting a drop in 1978 as the result of lower foreign trade.
  - Plastic materials and resins will have 1978 shipments of more than \$10 billion, 14% above 1977, while paint products account for another \$6.7 billion and soaps and detergents an additional \$6.6 billion, each up 10% or 11%.
  - The value of drug shipments in 1978 will be \$13.6 billion, less than 10% above 1977.
  - Food, beverage, tobacco, and textiles and other consumer oriented process industries are forecast to experience lower growth rates in the 6-7% range.
- As compared with discrete manufacturing, the respondents in the process manufacturing sector appear to be growing slower and more along inflationary lines with individual company growth just slightly exceeding overall industry growth.

- The importance of EDP in achieving company growth was ranked somewhat higher in this sector than in discrete manufacturing with several indications that EDP was of major importance. Analysis within subsectors shows that this attitude is more prevalent in chemicals and petroleum companies than in paper products and food processing where EDP use tends to be more along traditional lines.
- Top management concerns are oriented toward control rather than cost issues. In this regard, the subjects of commonality of systems, software portability and centralization surfaced frequently in place of cost reduction or cost avoidance. 1978 also appears to have been a year where budget plans are being met or are coming in lower than planned.
- Somewhat more concern was displayed than in other sectors with regard to contingency planning for a 1979 recession. In two instances, actual plans were developed as part of new budget submissions. One company reported still to be operating under 1974 constraints.
- Process manufacturing yielded 86 responses in four different questionnaire categories, or 17% of the total for this report. The contributing industry groups included companies with SIC codes in the 10, 12, 14, 20, 21, 22, 24, 26, 28, 29, 30, 32, and 33 categories.
  - Of these, the majority of responses came from food products (SIC 10), and paper products (SIC 26). The next highest categories were textile mill products (SIC 22) and chemical products (SIC 28).
- Exhibit 1-1 provides a profile summary of respondents in the process manufacturing sector for companies in three size categories.
  - One-sixth (16%) of the companies reported annual sales of less than \$100 million with a range of \$30 million to \$80 million, and averaging \$67 million. This average company employs 1,575 personnel of which 19 (1.2%) are EDP personnel, and has an annual EDP budget of \$535,000

# EXHIBIT I-1

## RESPONDENT PROFILE- PROCESS MANUFACTURING SECTOR

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	16%	72%	12%
AVERAGE ANNUAL SALES	\$67M	\$349M	\$3.12B
AVERAGE TOTAL EMPLOYEES	1,575	4,168	42,400
AVERAGE EDP EMPLOYEES	19	55	439
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	1.2	1.3	1.0
AVERAGE EDP BUDGET	\$535,000	\$1,925,000	\$18,650,000
EDP BUDGET % OF ANNUAL SALES	0.79%	0.55%	0.59%
EDP BUDGET PER EDP EMPLOYEE	\$28,200	\$35,000	\$42,500
EDP BUDGET PER TOTAL EMPLOYEE	\$340	\$462	\$440



(.8% of annual sales) which translates to \$28,200 per EDP employee and about \$340 per total company employee.

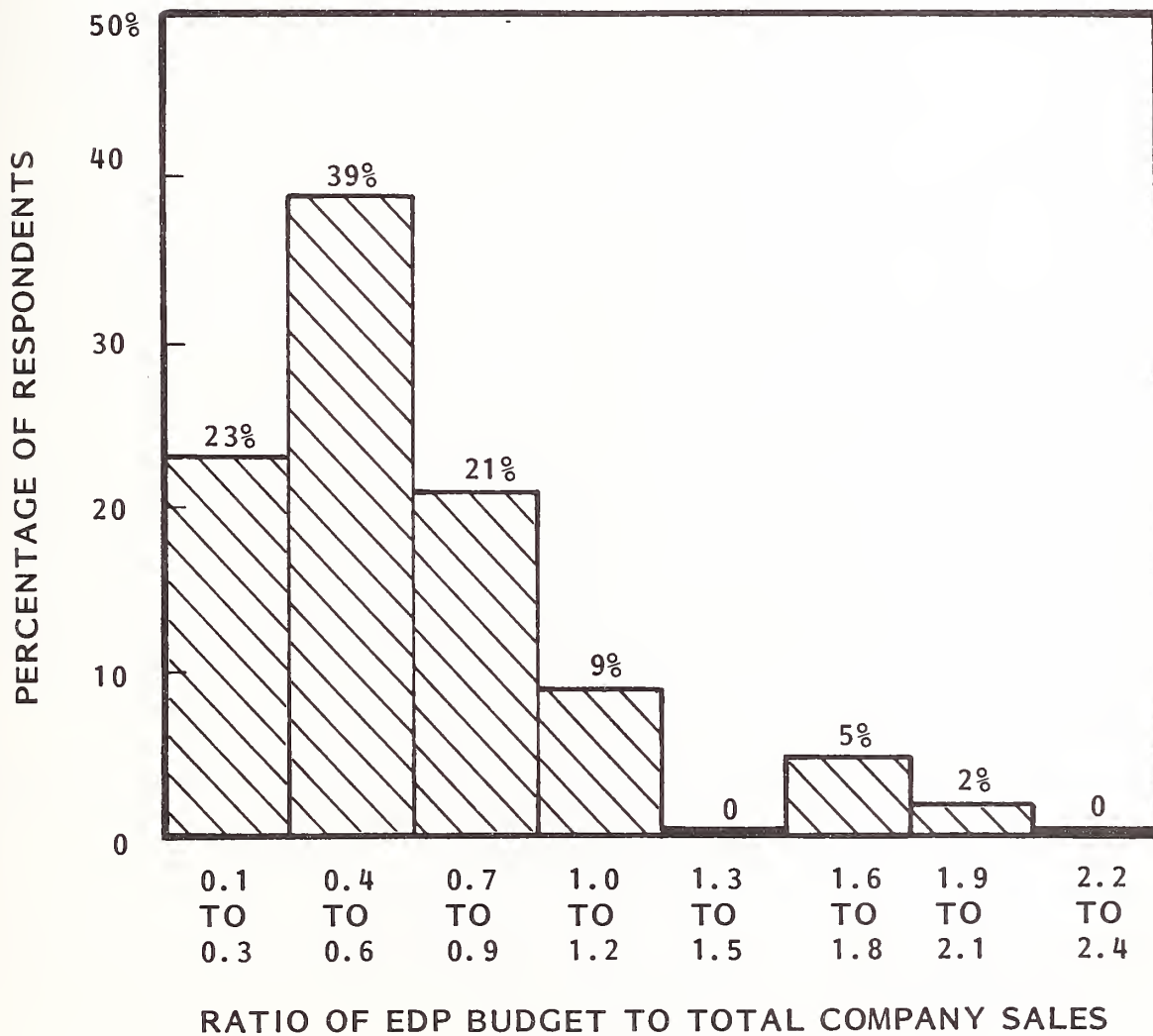
- Almost 75% of the respondents ranged in size from \$100 million to \$1 billion in annual sales. The average company in this category has sales of \$349 million, employs 4,200 people of which 55 (1.3%) are involved in EDP, and has an EDP budget of \$1.925 million which represents .55% of the company's annual sales.
- The largest process manufacturing companies responding to INPUT's survey average \$3.1 billion in annual sales and employ an average of 439 EDP personnel, slightly more than 1% of the total 42,400 employees. These companies reported EDP budgets which average \$18.6 million or about .6% of their total company sales.
- Exhibit I-2 provides a measure of the range of values for the ratio of EDP budget to total company sales reported by process manufacturing respondents. The mean value for the industry is .73% compared to 1.27% for respondents across all industries.

## 2. BUDGET AND EXPENDITURE ANALYSIS

- EDP expenditures in the process manufacturing sector will increase an average of 9.9% in 1979 according to respondents, but will continue at a somewhat

EXHIBIT 1-2

DISTRIBUTION OF EDP BUDGET TO  
COMPANY SALES RATIOS FOR RESPONDENTS IN THE  
PROCESS MANUFACTURING SECTOR

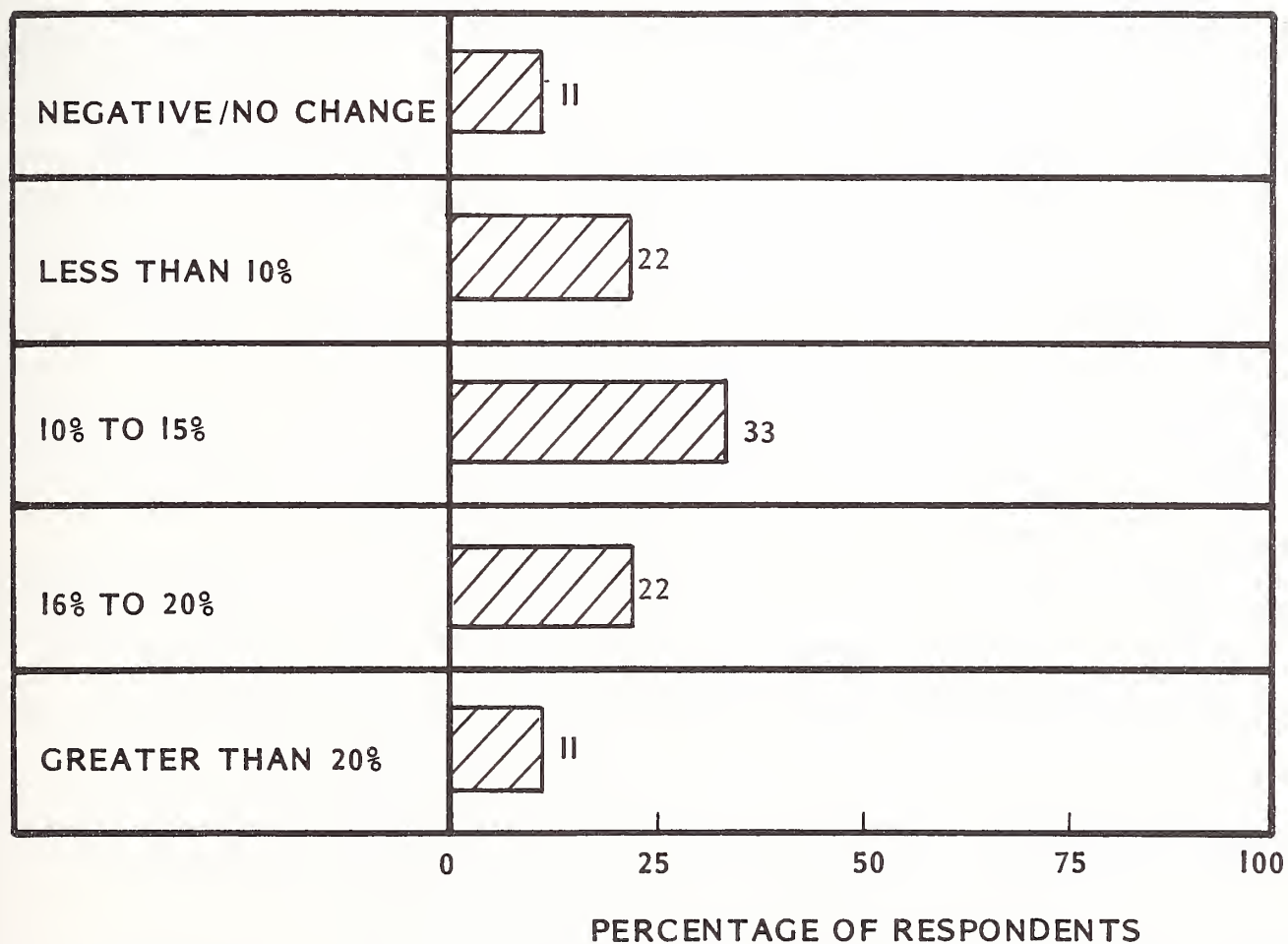


higher rate through 1983. Exhibit I-3 provides a distribution of planned budget growth for the 1978 to 1979 period.

- As a percentage of the total EDP budget, expenditures for small computers, terminals, communications, and software will rise steadily in 1979 and 1980. During the same period, expenditures for mainframe computers, personnel, and miscellaneous other (supplies, forms, etc.) are forecast to decrease as a percentage as indicated in Exhibit I-4 .
  - Based on the expected 9.9% budget increase for 1979, the absolute dollar expenditure in every budget category will be higher except in the miscellaneous other category.
- Exhibit I-5 provides a measure of the continuing growth of computer services and software in the process manufacturing sector as foreseen by EDP managers. As shown, significant increases are expected in 1978 for most types of services.
  - It should be noted that the decline or low increase in processing services expenditures represent significant differences from previous INPUT forecasts. It is our opinion that control of most outside services purchases is not usually vested in the central EDP department (the source of most data contained in this report).
  - While there is movement toward bringing remote computing services "in-house" which will reduce outside expenditures under EDP department control, there is still a significant increase in end user expenditure taking place as evidenced by other INPUT studies of the situation.
  - Based on INPUT's 1978 study of the computer services industry, expenditure increases from 1977 to 1978 for process manufacturing are expected as follows: 21% for remote computing, 11% for batch, 36% for software products, 5% for professional services, and 17% overall.

# EXHIBIT I-3

## 1978-1979 PLANNED EDP BUDGET GROWTH FOR RESPONDENTS - PROCESS MANUFACTURING SECTOR



# EXHIBIT 1-4

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE PROCESS MANUFACTURING SECTOR

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	27%	26%	26%	(4)%
SMALL COMPUTERS / PROGRAMMABLE TERMINALS	6	7	9	50
NON-PROGRAMMABLE TERMINALS	2	3	4	100
COMMUNICATIONS	3	4	6	100
SOFTWARE (PURCHASE/LEASE)	3	4	5	67
PERSONNEL	46	45	43	(7)
OTHER	10	9	7	(30)

# EXHIBIT 1-5

## AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE PROCESS MANUFACTURING SECTOR

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$61	\$63	3 %
REMOTE BATCH	19	15	(21)
BATCH	4	4	0
INPUT /OUTPUT	10	11	1
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$30	\$34	14 %
APPLICS. SOFTWARE	25	48	92
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$36	\$56	56 %
EDP CONSULTING	20	14	(30)
EDUCATION	10	13	30
OTHER	12	18	50
<u>FACILITIES MANAGEMENT</u>	-	-	-
<u>MAINTENANCE</u>	\$75	\$96	28 %

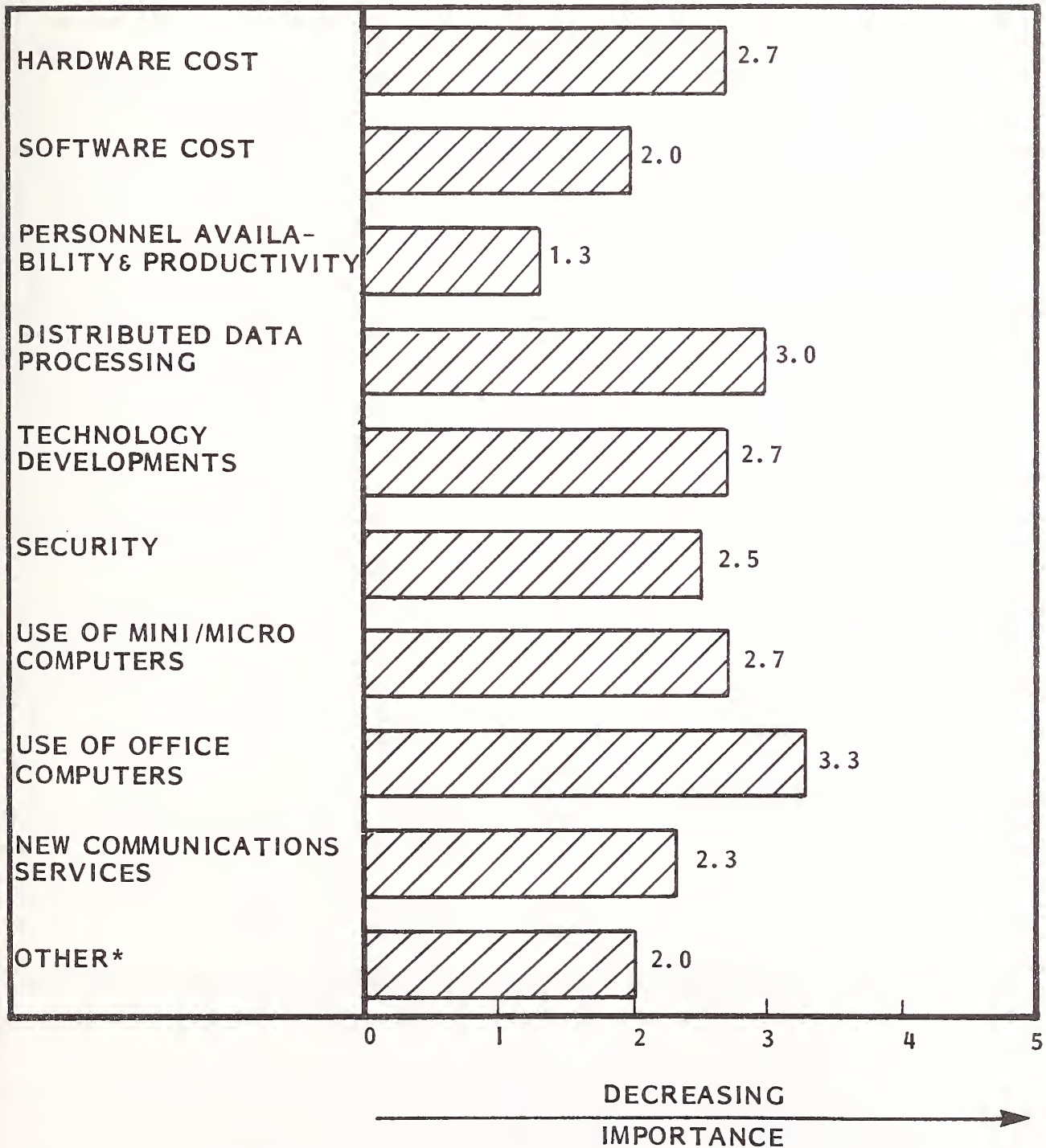


### 3. MAJOR PLANS AND PROBLEMS

- Study respondents who were visited or contacted by telephone for this study were asked to rank the importance of certain EDP/communications factors. As shown in Exhibit I-6 the most important factors in the process manufacturing sector were personnel availability and productivity and software related.
- All respondents to this study were queried regarding major EDP objectives for 1978, 1979, and 1980. Exhibit I-7 summarizes their responses and provides a ranking based on the number of mentions for major categories.
  - New application development and on-line application development remained at a high level through 1980, accounting for nearly 40% of all mentions.
  - The implementation of data base and distributed data processing systems nearly doubles as a combined percentage of mention in 1980.
  - The installation and upgrade of mainframes picks up as an objective in 1980, consistent with the planned high delivery rates of IBM 303X among respondents.
- Exhibit I-8 provides an indication of the applications being planned and developed by the process manufacturing sector, together with an indication of which applications are considered to be of highest priority.
  - Accounting/finance and order entry applications rank high both in the number of mentions and the level of priority.
  - Financial and administrative applications received two-thirds of the total mentions, outpacing marketing and technically oriented applications.

## EXHIBIT I-6

### IMPORTANCE OF EDP/COMMUNICATION FACTORS RANKED BY RESPONDENTS IN THE PROCESS MANUFACTURING SECTOR



\*SPECIFIC FACTORS MENTIONED INCLUDE:

- DATA BASE MANAGEMENT SYSTEMS

# EXHIBIT I-7

## EDP OBJECTIVES FOR RESPONDENTS IN THE PROCESS MANUFACTURING SECTOR

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	10%	7%	12%
DESIGN/INSTALL DDP	5	8	14
NEW APPLICATIONS	19	18	20
ON-LINE APPLICATIONS	18	24	16
INSTALL/UPGRADE MAINFRAME	12	11	18
INSTALL MINIS	2	3	0
INSTALL OPERATING SYSTEM	2	3	4
IMPROVE OPERATIONS	15	8	6
CENTRALIZE (OR DECENTRALIZE)	7	12	8
OTHER*	<u>10</u> 100%	<u>6</u> 100%	<u>2</u> 100%
TOTAL MENTIONS	84	74	49

### \*SPECIFIC RESPONSES INCLUDE:

- Develop Long Range Plans
- Downgrade Mainframe
- Reduce Hardware Costs
- Electronic Mail

# EXHIBIT I-8

## APPLICATIONS TO BE DEVELOPED BY RESPONDENTS IN THE PROCESS MANUFACTURING SECTOR

APPLICATION	PERCENT OF MENTIONS	% OF MENTIONS AS HIGHEST PRIORITY
ACCOUNTING/FINANCE	20%	18%
COST SYSTEMS	5	3
INVENTORY CONTROL	10	13
ORDER ENTRY/BILLING	16	28
PERSONNEL/PAYROLL	12	7
PURCHASING	4	2
MARKETING/SALES	5	3
MODELING/FORECASTING	3	0
COMMUNICATIONS	2	0
GRAPHICS	1	0
SCIENTIFIC/ENGINEERING	1	0
DATA BASE	5	7
ELECTRONIC MAIL	0	0
WORD PROCESSING	1	0
PERFORMANCE MEASUREMENT	0	0
OTHER* (INDUSTRY SPECIFIC)	15	19
TOTAL	100%	100%

\*SPECIFIC APPLICATIONS INCLUDE:

- Manufacturing
- Scheduling
- Distribution



- Lack of user involvement in system and application development and need for improved operations are considered to be the most significant EDP problems in the process manufacturing sector as shown in Exhibit I-9 .
  - This represents a change from 1976 when communications and security were given as the most significant problems.
- Consistent with other manufacturing industry respondents, the process manufacturing sector uses nearly as much of its equipment and applications programming personnel resources for maintaining existing programs as developing new ones (see Exhibit I-10 ).
- Exhibit I-11 provides a list and ranking of the most popular methods being used in the process manufacturing sector to reduce or improve the time and cost associated with the development of new applications.
  - The purchase of outside software and the use of on-line programming techniques comprise more than 50% of all mentions.
- The expected increase in expenditures for communications and terminal devices through 1980 in the process manufacturing sector is further clarified by analyzing the reasons for terminal installation for the same period. Exhibit I-11 provides such an analysis.
  - Eighty-six percent of respondents indicate that source data input requirements were of high importance in terms of their terminal installations for the next three years (see Exhibit I-12 ).
  - Approximately one-half of all respondents stated that data base inquiry and distributed data processing applications were reasons of high importance for installing terminals.

# EXHIBIT I-9

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE PROCESS MANUFACTURING SECTOR

ITEM	% OF MENTIONS
LACK OF USER INVOLVEMENT IN SYSTEM/APPLICATION DEVELOPMENT	15%
NEED FOR OPERATIONS IMPROVEMENT	15
LACK OF EFFECTIVE LONG-RANGE EDP PLANS	9
PERSONNEL PRODUCTIVITY AND AVAILABILITY	7
NEED FOR MORE EFFECTIVE COST CONTROL	7
LACK OF STANDARDS AND DOCUMENTATION	7
LACK OF UNDERSTANDING BY NON-EDP MANAGEMENT	7
IMPROPER ORGANIZATION	5
NEED FOR FACILITY UPGRADE (INCLUDING HARDWARE)	5
OTHER	23
<ul style="list-style-type: none"> <li>- RELUCTANCE TO CHANGE</li> <li>- INABILITY TO EVALUATE ALTERNATIVES</li> <li>- DDP IMPLEMENTATION</li> <li>- USER EDUCATION</li> <li>- CONSOLIDATION/ELIMINATION OF EXISTING SYSTEMS</li> <li>- EDP AUDITING</li> <li>- GUIDING THE ORGANIZATION FROM CENTRALIZED TO EFFECTIVE DISTRIBUTED STRUCTURE</li> </ul>	



# EXHIBIT I-10

## USE OF RESOURCES - PROCESS MANUFACTURING SECTOR

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT : <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	<div>67%</div> <div>16</div> <div>14</div> <div>3</div> <hr/> <div>100%</div>
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL : <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	<div>54%</div> <div>43</div> <div>3</div> <hr/> <div>100%</div>

OTHER MENTIONS INCLUDE :

<sup>1</sup> IDLE TIME

<sup>2</sup> TRAINING  
SPECIAL MARKETING PROMOTIONS

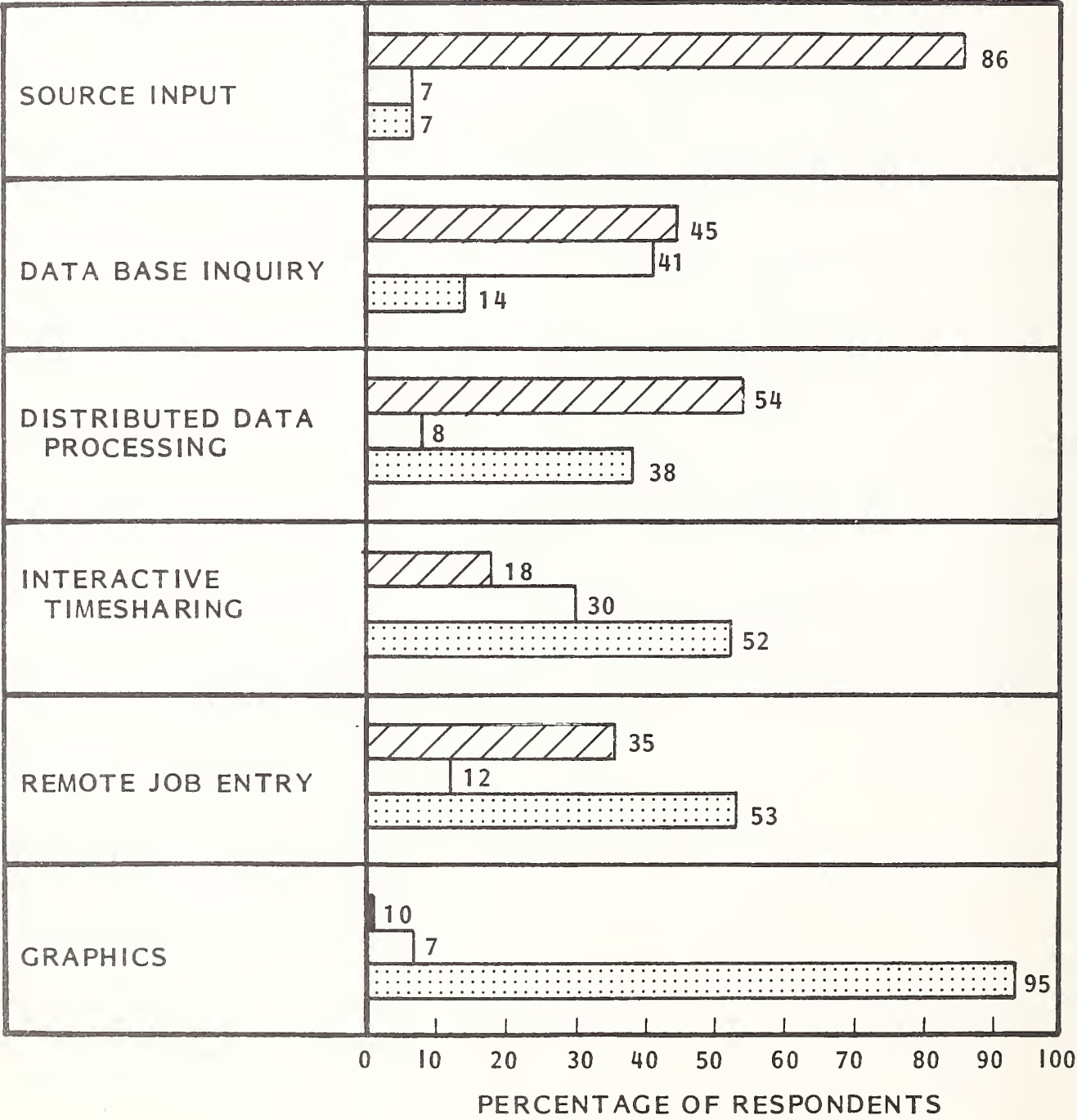
# EXHIBIT I-11




## METHODS USED TO IMPROVE TIME AND COSTS ASSOCIATED WITH APPLICATIONS DEVELOPMENT- PROCESS MANUFACTURING SECTOR

METHOD	% OF MENTIONS
PURCHASED SOFTWARE PACKAGES	32%
ON-LINE PROGRAMMING	21
STRUCTURED PROGRAMMING	11
MORE EXPERIENCED AND TRAINED PERSONNEL	11
OTHER	25
<ul style="list-style-type: none"> <li>- DBMS</li> <li>- IMPROVED STANDARDS</li> <li>- PROGRAMMING AIDS</li> <li>- PROJECT MANAGEMENT</li> <li>- USER INVOLVEMENT</li> </ul>	

EXHIBIT I-12

RELATIVE IMPORTANCE OF REASONS FOR INSTALLING TERMINALS  
DURING THE NEXT THREE YEARS-  
PROCESS MANUFACTURING SECTOR



-  = HIGH IMPORTANCE
-  = MEDIUM IMPORTANCE
-  = LOW IMPORTANCE

- Interactive timesharing and remote job entry have dropped to the point where more than one-half of the respondents rank these as reasons of low importance for terminal installation in the next three years.

#### 4. KEY ISSUE STATUS REVIEW

- Data base management systems have been installed by 53% of the 32 process manufacturing firms responding to DBMS questions as shown in Exhibit I-13 . In those installations:
  - Forty-one percent of the systems were provided by IBM, 18% by other hardware vendors, and 41% by independent software suppliers.
  - The general level of satisfaction with the installed DBMS systems is good, although one-fourth of those firms with DBMS are evaluating alternatives.
  - Most of the installations were made since 1976.
- Distributed data processing systems of some type exist in 36% of the process manufacturing respondent's firms. In addition, 10% of the respondents are presently implementing DDP systems, 40% are considering DDP systems, and only 14% indicate that DDP is not applicable (see Exhibit I-14 ). DDP applications and intended applications for this industry sector as given by respondents include:
  - Plant/division processing.
  - EDP centralization.
  - Offloading central CPU.
  - Data collection, editing, and inquiry.

# EXHIBIT I-13

## DATA BASE MANAGEMENT SYSTEM STATUS FOR RESPONDENTS IN THE PROCESS MANUFACTURING SECTOR

FACTOR/CONSIDERATION IN PERCENT OF RESPONDENTS		
DBMS INSTALLED	CURRENTLY EVALUATING ALTERNATIVE DBMS	
YES 53%	YES 12%	NO 41%
NO 47%	YES 9%	NO 38%
<p>IF DBMS INSTALLED:</p> <p><u>DEVELOPER</u></p> <ul style="list-style-type: none"> <li>● IBM 41%</li> <li>● OTHER HARDWARE 18</li> <li>● INDEPENDENT 41</li> </ul> <p><u>LEVEL OF SATISFACTION</u></p> <ul style="list-style-type: none"> <li>● SATISFIED 65%</li> <li>● ACCEPTABLE 12</li> <li>● DISSATISFIED 12</li> <li>● UNKNOWN 11</li> </ul> <p><u>YEAR OF INSTALLATION</u></p> <ul style="list-style-type: none"> <li>● 1978 12%</li> <li>● 1977 35</li> <li>● 1976 12</li> <li>● 1975 6</li> <li>● EARLIER 35</li> <li>● NO ANSWER 0</li> </ul>		

# EXHIBIT I-14

## RESPONDENT INVOLVEMENT IN DISTRIBUTED DATA PROCESSING- PROCESS MANUFACTURING SECTOR

RESPONSE	PERCENT OF RESPONDENTS
DISTRIBUTED DATA PROCESSING ALREADY INSTALLED	36%
DISTRIBUTED DATA PROCESSING BEING IMPLEMENTED	10
DISTRIBUTED DATA PROCESSING UNDER CONSIDERATION	40
DISTRIBUTED DATA PROCESSING NOT APPLICABLE	14
TOTAL	100%



- Order entry.
- Payroll.
- Exhibit I-15 summarizes the status of various office automation involvement areas by EDP departments in process manufacturing. Not surprisingly, the highest level of participation is in the data communications area with a reasonable level of participation in word processing, facsimile and electronic mail expected by 1983. Consistent with other industry sectors, video conferencing is not expected to be the subject of much attention.

EXHIBIT I-15

RESPONDENT INVOLVEMENT IN OFFICE AUTOMATION -  
PROCESS MANUFACTURING SECTOR

AREA OF INVOLVEMENT	PERCENT OF RESPONDENTS		
	CURRENT	BETWEEN 1978 AND 1983	NOT BY 1983
ELECTRONIC MAIL	17%	36%	47%
WORD PROCESSING	33	39	28
COPYING/DUPLICATING	22	11	67
DATA COMMUNICATIONS	88	12	-
VOICE COMMUNICATIONS	30	16	54
FACSIMILE	51	10	39
VIDEO CONFERENCING	6	11	83







1978 ANALYSIS OF EDP IN  
RETAIL DISTRIBUTION



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1978 ANALYSIS OF EDP IN  
RETAIL DISTRIBUTION



## RETAIL DISTRIBUTION

### I. INDUSTRY SECTOR OVERVIEW

- Retail sales in 1978 are expected to grow to \$785 billion, almost 10% above 1977, with the total number of establishments exceeding 1.8 million and the total number of employees exceeding 14 million for the first time.
- Although "electronics" have penetrated store operations to improve customer service and lower costs, their progress has met with resistance.
  - The instantaneous banking capability effected through retail (primarily supermarket) checkouts has been limited in large measure to check verification applications.
  - Also slow in its adoption has been computer-driven checkout scanners (CCS) because of the industry's continuing need to reassure both the consumer and labor that CCS will not be introduced at their expense.
- The anticipated 1979 growth in EDP expenditures for the retail sector parallels the expected 10% growth in retail sales. This growth is expected to be higher for the next five-year period as the level of automation increases with POS and EFTS systems receiving greater levels of acceptance.
- Responses on the importance of EDP in achieving company growth ranged from major with top priority consideration given to EDP in corporate considerations to minor in some smaller and less progressive (by their measure) firms.
- Management responses indicate that 1978 EDP plans are on budget, that 1979 plans will not be affected by any special considerations for a recession ("we couldn't get by with any less" as stated by one respondent), and that primary

concerns center on the availability of reliable new technology for implementing new systems.

- Retail distribution yielded 24 responses or 5% of the total for this study. The contributing industry groups included companies in the 52, 53, 54, 56, 58, and 59 SIC categories. More than 50% of the responses were from general merchandise firms (SIC 53) and food stores (SIC 54).
- Exhibit I-1 provides a profile of respondents in the retail distribution sector for companies in three size categories:
  - Twelve percent (three respondents) of the companies reported annual sales of less than \$100 million, averaging \$52 million. This average company employs 720 persons of which 9 (1.2%) are EDP personnel, and has an annual EDP budget of \$200,000, (.4% of sales) which translates to \$22,200 per EDP employee and about \$300 per total company employee.
  - Sixty percent of the respondents (15 companies) ranged in size from \$100 million to \$1 billion. The average company in this category has sales of \$300 million, employs 7,700 people of which 61 (.8%) are involved in EDP, and has an EDP budget of \$1.8 million which represents .6% of the company's annual sales.
  - The largest companies responding to INPUT's study averaged nearly \$1.5 billion in annual sales and employed an average of 123 EDP personnel, slightly less than .6% of the total 21,500 employees. These companies reported EDP budgets which average \$3.8 million or about .3% of total company sales, the lowest percentage of any industry sector.
- Another observation from Exhibit I-1 includes the fact that the EDP budget per total employee ratio of less than \$200 is the lowest of any industry sector.



# EXHIBIT I-1

## RESPONDENT PROFILE - RETAIL DISTRIBUTION SECTOR

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	13%	65%	22%
AVERAGE ANNUAL SALES	\$52M	\$298M	\$1475M
AVERAGE TOTAL EMPLOYEES	7,720	7,678	21,500
AVERAGE EDP EMPLOYEES	99	61	123
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	2.20	0.8	0.6
AVERAGE EDP BUDGET	\$0.2M	\$1.8M	\$3.8M
EDP BUDGET % OF ANNUAL SALES	0.4%	0.6%	0.3%
EDP BUDGET PER EDP EMPLOYEE	\$22.2K	\$29.5K	\$30.9K
EDP BUDGET PER TOTAL EMPLOYEE	\$0.33K	\$0.2K	\$0.2K



- Exhibit 1-2 provides a measure of the range of values for the ratio of EDP budget to total company sales reported by the retail sector respondents. The mean value for this sector is .4% compared to 1.27% for respondents across all industries.

## 2. BUDGET AND EXPENDITURE ANALYSIS

- EDP expenditures in the retail distribution sector will increase an average of 10% in 1979 according to respondents, but will continue at the higher rate of 12 to 15% through 1983. Exhibit 1-3 provides a distribution of planned budget growth for the 1978 to 1979 period.
- As a percentage of the total EDP budget, expenditures for small computers, communications and software will rise steadily in 1979 and 1980. During the same period, expenditures for mainframe computers, personnel, and non-programmable terminals are forecast to decrease as a percentage as indicated in Exhibit 1-4 .
  - Based on the expected 10% budget increase for 1979, the absolute dollar expenditure in every budget category will be higher.
- Exhibit 1-5 provides a measure of the growth of computer services and software in the retail sector as foreseen by EDP managers. As shown, a significant decrease is expected in 1978 of 23% overall.
  - It should be noted that the decline or low increase in processing services expenditures represent significant differences from previous INPUT forecasts. It is our opinion that control of most outside services purchases is not usually vested in the central EDP department (the source of most data contained in this report).
  - While there is movement toward bringing remote computing services "in-house" which will reduce outside expenditures under EDP department control, there is still a significant increase in end user

EXHIBIT I-2

DISTRIBUTION OF EDP BUDGET TO  
COMPANY SALES RATIOS FOR RESPONDENTS IN THE  
RETAIL DISTRIBUTION SECTOR

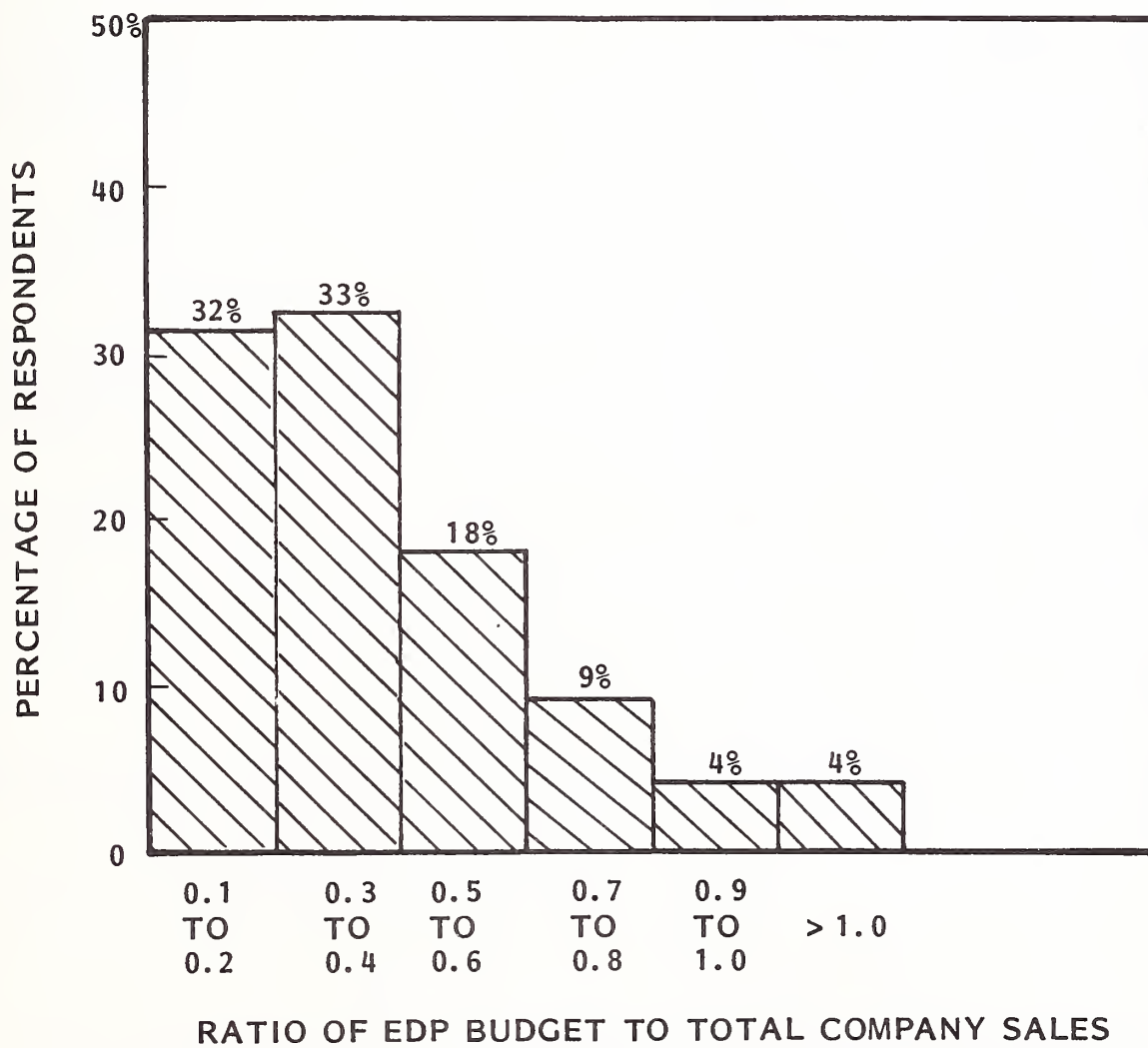


EXHIBIT I-3

1978-1979 PLANNED EDP BUDGET GROWTH  
FOR RESPONDENTS -  
RETAIL DISTRIBUTION SECTOR

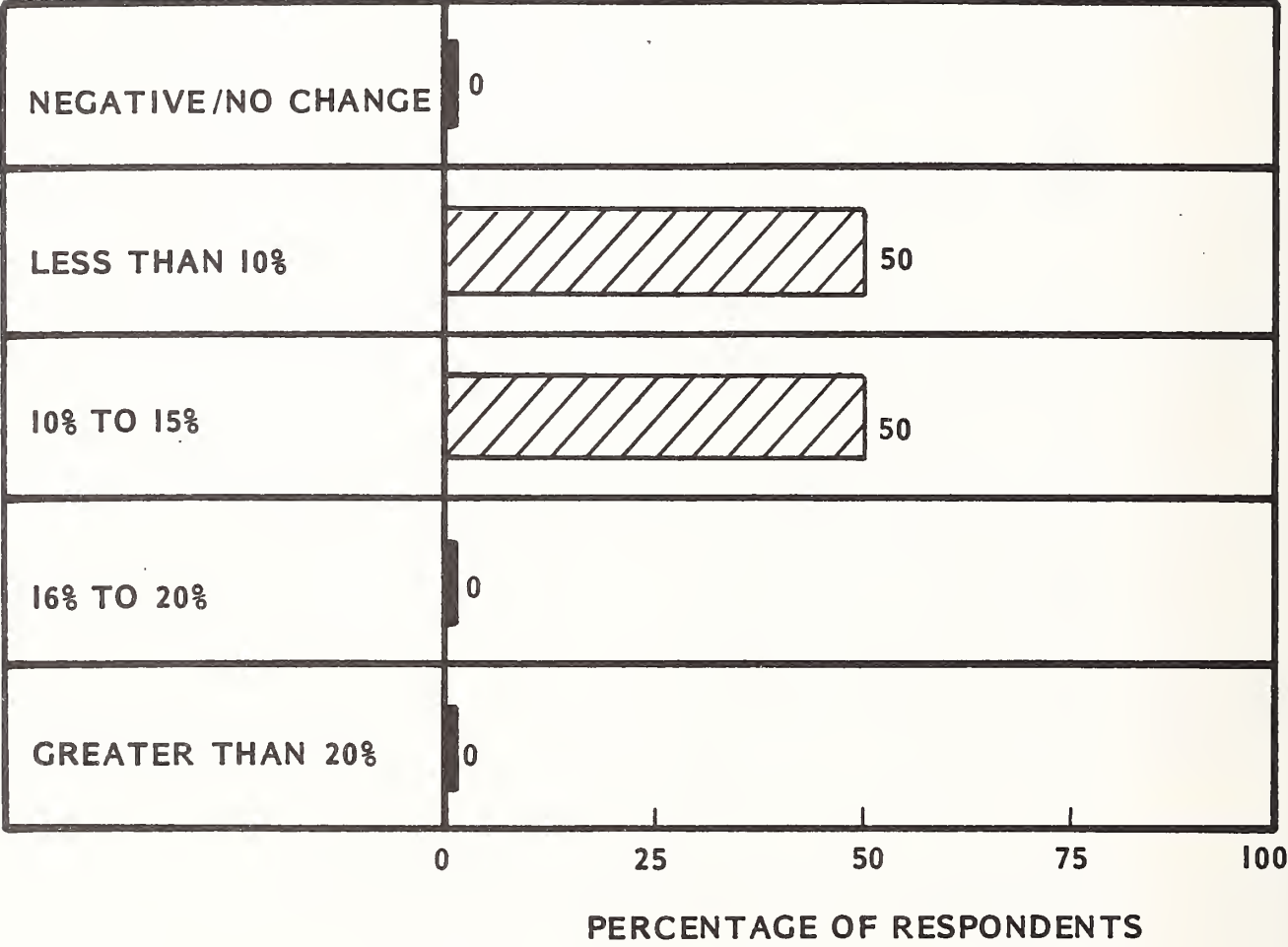


EXHIBIT I-4

ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE  
RETAIL DISTRIBUTION INDUSTRY

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	28%	26%	23%	(18)%
SMALL COMPUTERS / PROGRAMMABLE TERMINALS	2	4	3	50
NON-PROGRAMMABLE TERMINALS	2	2	1	(50)
COMMUNICATIONS	2	2	4	100
SOFTWARE (PURCHASE/LEASE)	2	3	3	50
PERSONNEL	47	45	45	(4)
OTHER	16	16	19	19

# EXHIBIT I-5

## AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE RETAIL DISTRIBUTION SECTOR

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$143	\$ 64	(55)%
REMOTE BATCH	-	-	-
BATCH	18	20	11
INPUT/OUTPUT	30	34	13
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$ 42	\$ 33	(21)%
APPLICS. SOFTWARE	41	34	(17)
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$114	\$124	9 %
EDP CONSULTING	41	6	(85)
EDUCATION	6	6	0
OTHER	-	-	-
<u>FACILITIES MANAGEMENT</u>	-	4	-
<u>MAINTENANCE</u>	\$ 27	\$ 31	15%



expenditure taking place as evidenced by other INPUT studies of the situation.

- Based on these other studies, INPUT forecasts for 1978 for the retail sector show increases of 22% in remote computing, 40% in software products, 25% in professional services, and 20% overall.

### 3. MAJOR PLANS AND PROBLEMS

- All respondents to this study were queried regarding major EDP objectives for 1978, 1979, and 1980. Exhibit I-6 summarizes their responses and provides a ranking based on the number of mentions for major categories.
  - New application development and on-line application development remained at a high level through 1980, accounting for 45% of all mentions.
  - The implementation of data base and distributed data processing systems is surprisingly lower than almost all other industry groups.
  - The installation and upgrade of mainframes picks up as an objective in 1980, consistent with the planned high delivery rates of large scale systems among respondents.
- Exhibit I-7 provides an indication of the applications being planned and developed by the retail distribution sector, together with an indication of which applications are considered to be of highest priority.
  - Accounting/finance, inventory control, and personnel-type systems rank high both in the number of mentions and level of priority.
  - Financial and administrative applications received more than two-thirds of the total mentions far outpacing marketing and technically oriented applications.



# EXHIBIT I-6

## EDP OBJECTIVES FOR RESPONDENTS IN THE RETAIL DISTRIBUTION SECTOR

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	3%	4%	10%
DESIGN/INSTALL DDP	3	0	0
NEW APPLICATIONS	21	13	25
ON-LINE APPLICATIONS	24	46	20
INSTALL/UPGRADE MAINFRAME	17	13	25
INSTALL MINIS	7	0	0
INSTALL OPERATING SYSTEM	3	0	0
IMPROVE OPERATIONS	10	17	10
CENTRALIZE (OR DECENTRALIZE)	0	0	0
OTHER*	<u>12</u> 100%	<u>7</u> 100%	<u>10</u> 100%
TOTAL MENTIONS	29	24	20

\*SPECIFIC RESPONSES INCLUDE:

- Long Range Planning
- Communications Network

# EXHIBIT I-7

## APPLICATIONS TO BE DEVELOPED BY RESPONDENTS IN THE RETAIL DISTRIBUTION SECTOR

APPLICATION	PERCENT OF MENTIONS	% OF MENTIONS AS HIGHEST PRIORITY
ACCOUNTING/FINANCE	19%	13%
COST SYSTEMS	0	0
INVENTORY CONTROL	19	19
ORDER ENTRY/BILLING	10	19
PERSONNEL/PAYROLL	16	19
PURCHASING	6	6
MARKETING/SALES	8	0
MODELING/FORECASTING	2	6
COMMUNICATIONS	0	0
GRAPHICS	0	0
SCIENTIFIC/ENGINEERING	0	0
DATA BASE	5	0
ELECTRONIC MAIL	0	0
WORD PROCESSING	0	0
PERFORMANCE MEASUREMENT	0	0
OTHER* (INDUSTRY SPECIFIC)	15	18
TOTAL	100%	100%

\*SPECIFIC APPLICATIONS INCLUDE:

- Point of Sale
- Energy Control
- Distribution

- Personnel availability and productivity are considered to be the most significant EDP problems in the retail sector as shown in Exhibit 1-8 .
  - This represents a change from 1976 when costs, lack of standards and difficulty in handling data bases were given as the most significant problems.
- Consistent with other industry respondents, the retail sector uses nearly as much of its equipment and application programming personnel resources maintaining existing program as developing new ones (see Exhibit 1-9 ).
- Exhibit 1-10 provides a list and a ranking of the most popular methods being used in the process manufacturing sector to reduce or improve the time and cost associated with the development of new applications.
  - The improved planning and the use of on-line programming techniques comprise more than 35% of all mentions.
- The expected increase in expenditures for communications and terminal devices through 1980 in the retail sector is clarified by analyzing the reasons for terminal installation for the same period. Exhibit 1-11 provides such as analysis.
  - Seventy-five percent of respondents indicate that source data input requirements were of high importance in terms of terminal installations for the next three years.
  - One-half of all respondents stated that data base inquiry and remote job entry were high importance reasons for installing terminals.
  - Interactive timesharing has dropped to the point where two-thirds of the respondents ranked it as a low importance reason for terminal installation.

# EXHIBIT I-8

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE RETAIL DISTRIBUTION SECTOR

ITEM	% OF MENTIONS
PERSONNEL AVAILABILITY AND PRODUCTIVITY	17%
LACK OF MANAGEMENT UNDERSTANDING OR INVOLVEMENT	13
INADEQUATE PLANNING METHODOLOGY	13
LACK OF USER INVOLVEMENT IN SYSTEM AND APPLICATION DEVELOPMENT	10
NEED FOR IMPROVED OPERATIONS	10
OTHER	37
<ul style="list-style-type: none"><li>- INADEQUATE SYSTEMS AND SOFTWARE</li><li>- EXCESSIVE APPLICATION DEVELOPMENT AND MAINTENANCE TIME</li><li>- NEED FOR IMPROVED DOCUMENTATION</li><li>- NEED FOR COST IMPROVEMENT</li><li>- LACK OF METHOD FOR JUSTIFYING LOW ROI PROJECTS</li><li>- INADEQUATE ORGANIZATION</li><li>- NEED FOR BETTER SERVICE BY VENDORS</li></ul>	

# EXHIBIT I-9

## USE OF RESOURCES - RETAIL DISTRIBUTION SECTOR

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT: <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	73% 14 13 0 <hr/> 100%
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL: <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	56% 43 1 <hr/> 100%

OTHER MENTIONS INCLUDE:

<sup>1</sup> TRAINING  
SYSTEMS SUPPORT

EXHIBIT I-10

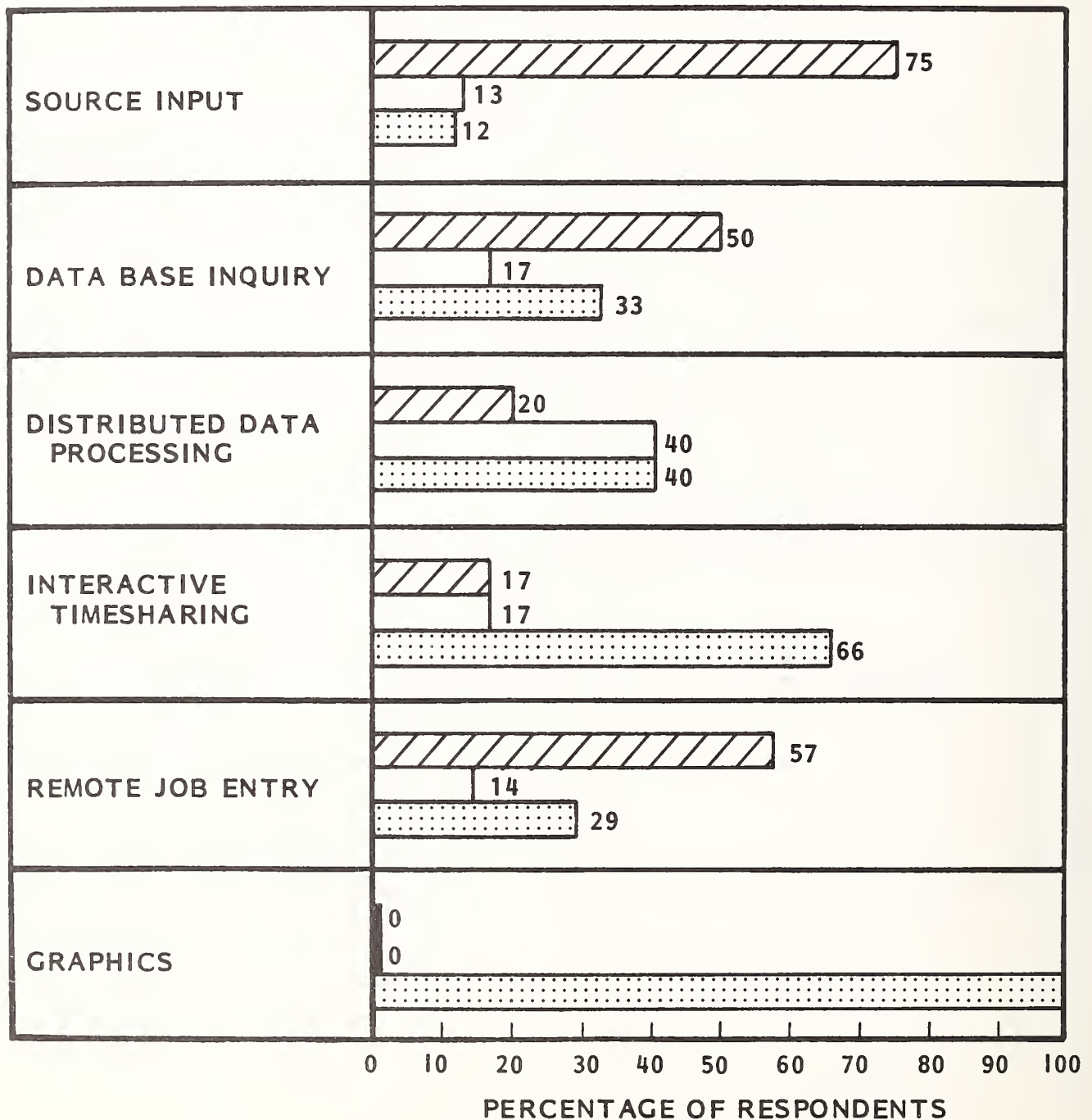
METHODS USED TO IMPROVE TIME AND COSTS  
ASSOCIATED WITH APPLICATIONS DEVELOPMENT-  
RETAIL DISTRIBUTION SECTOR




METHOD	% OF MENTIONS
ON-LINE PROGRAMMING	18%
IMPROVED PLANNING	18
STRUCTURED PROGRAMMING METHODS	18
PROJECT MANAGEMENT SYSTEMS	14
IMPROVED USER PARTICIPATION	14
PURCHASED SOFTWARE PACKAGES	9
OTHER	9
- IMPROVED ORGANIZATION	
- TRAINING	



# EXHIBIT I-11

## RELATIVE IMPORTANCE OF REASONS FOR INSTALLING TERMINALS DURING THE NEXT THREE YEARS - RETAIL DISTRIBUTION SECTOR



-  = HIGH IMPORTANCE
-  = MEDIUM IMPORTANCE
-  = LOW IMPORTANCE

#### 4. KEY ISSUE STATUS REVIEW

- Data base management systems have been installed by 38% of the retail respondents as shown in Exhibit I-12 . In those installations:
  - One hundred percent of the systems were provided by IBM, and none by independent software suppliers. However, 13% are evaluating alternatives.
  - The general level of satisfaction with the DBMS system is split with one-third satisfied and one-third dissatisfied.
  - Most of the installations were made since 1976.
- Distributed data processing systems exist in 13% of the retail distribution respondent's firms. In addition, 38% of the respondents are considering DDP systems. Forty-nine percent indicate that DDP is not applicable (see Exhibit I-13 ). DDP applications for this industry sector as given by respondents include remote store processing and terminal replacement.
- Exhibit I-14 summarizes the status of various office automation involvement areas by EDP departments in retail distribution. Not surprisingly, the highest level of participation is in the data communication area with a reasonable level of participation in word processing (about 50%) expected by 1983. Consistent with other industry sectors, video conferencing is not expected to be the subject of much attention.

# EXHIBIT I-12

## DATA BASE MANAGEMENT SYSTEM STATUS FOR RESPONDENTS IN THE RETAIL DISTRIBUTION SECTOR

FACTOR/CONSIDERATION IN PERCENT OF RESPONDENTS		
DBMS INSTALLED	CURRENTLY EVALUATING ALTERNATIVE DBMS	
YES 38%	YES 13%	NO 25%
NO 62%	YES 37%	NO 25%

IF DBMS INSTALLED:

DEVELOPER

- IBM 100%
- OTHER HARDWARE 0
- INDEPENDENT 0

LEVEL OF SATISFACTION

- SATISFIED 33%
- ACCEPTABLE 33
- DISSATISFIED 34
- UNKNOWN 0

YEAR OF INSTALLATION

- 1978 0%
- 1977 67
- 1976 0
- 1975 33
- EARLIER 0
- NO ANSWER 0

**EXHIBIT I-13**

**RESPONDENT INVOLVEMENT IN DISTRIBUTED DATA PROCESSING-  
RETAIL DISTRIBUTION SECTOR**

<b>RESPONSE</b>	<b>PERCENT OF RESPONDENTS</b>
<b>DISTRIBUTED DATA PROCESSING ALREADY INSTALLED</b>	<b>13%</b>
<b>DISTRIBUTED DATA PROCESSING BEING IMPLEMENTED</b>	<b>0</b>
<b>DISTRIBUTED DATA PROCESSING UNDER CONSIDERATION</b>	<b>38</b>
<b>DISTRIBUTED DATA PROCESSING NOT APPLICABLE</b>	<b>49</b>
<b>TOTAL</b>	<b>100%</b>

# EXHIBIT I-14

## RESPONDENT INVOLVEMENT IN OFFICE AUTOMATION- RETAIL DISTRIBUTION SECTOR

AREA OF INVOLVEMENT	PERCENT OF RESPONDENTS		
	CURRENT	BETWEEN 1978 AND 1983	NOT BY 1983
ELECTRONIC MAIL	- %	31%	69%
WORD PROCESSING	20	27	53
COPYING/DUPLICATING	29	7	64
DATA COMMUNICATIONS	93	7	-
VOICE COMMUNICATIONS	33	7	60
FACSIMILE	21	8	71
VIDEO CONFERENCING	-	-	100







1978 ANALYSIS OF EDP IN  
SERVICE AND OTHER INDUSTRIES

## ABOUT INPUT

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The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

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1978 ANALYSIS OF EDP IN  
SERVICES AND OTHER INDUSTRIES



## SERVICE AND OTHER INDUSTRIES

### I. INDUSTRY SECTOR OVERVIEW

- The information contained in this section is intended to summarize findings for companies not included in the previously defined eight industry sectors.
  - It should not be assumed that these findings typify any industry group within this category.
- Respondents included in this section are representatives from education, government, agriculture, mining, construction, real estate, auto repair, and entertainment.
- Seventy-two responses were provided by the education sector as part of INPUT's EDP user panel. No additional information was sought by telephone or on-site visits.
  - EDP managers from educational institutions provided a limited indication of their institutions' annual operating budget and, therefore, the EDP budget as a percentage of annual budget could not be computed accurately.
  - For the institutions responding, the average employed 1,889 people of which 46 (2.4%) were EDP employees. This ratio is lower than those of the financial and insurance sectors, but higher than those for other industrial sectors.
  - The average EDP budget was \$1.1 million. This translates to \$23,900 per EDP employee and about \$600 per total institution employee, which is consistent with other industry sectors.



- Five interviews were conducted with EDP managers from federal and state government. Although this is a small sample, the growth rates, the plans and objectives, the ranking of problems, and the use of resources appear to be consistent with responses from other industry sectors.
- An additional 16 respondents from other categories provided responses. These are used in the analysis which follows.
- Exhibit I-1 provides a profile summary of these respondents for companies in three size categories:
  - About one-sixth (18%) of the companies reported annual sales of less than \$100 million averaging \$48 million. This average company employs 829 personnel of which 19 (2.3%) are EDP personnel, and has an annual EDP budget of \$500,000 (1.0% of annual sales) which translates to \$26,300 per EDP employee and about \$600 per total company employee.
  - Sixty-eight percent of the respondents ranged in size from \$100 million to \$1 billion in annual sales. The average company in this category is \$329 million, employs 3,800 people of which 57 (1.5%) are involved in EDP, and has an EDP budget of \$1.7 million which represents .5% of the company's annual sales.
  - The largest process manufacturing companies responding to INPUT's survey average \$2.4 billion in annual sales and employ an average of 466 EDP personnel, slightly more than 1% of the total 43,500 employees. These companies reported EDP budgets which average \$12.8 million or about .5% of their total company sales.
- Exhibit I-2 provides a measure of the range of values for the ratio of EDP budget to total company sales reported by respondents. The mean value for the group is .6% compared to 1.27% for respondents across all industries.

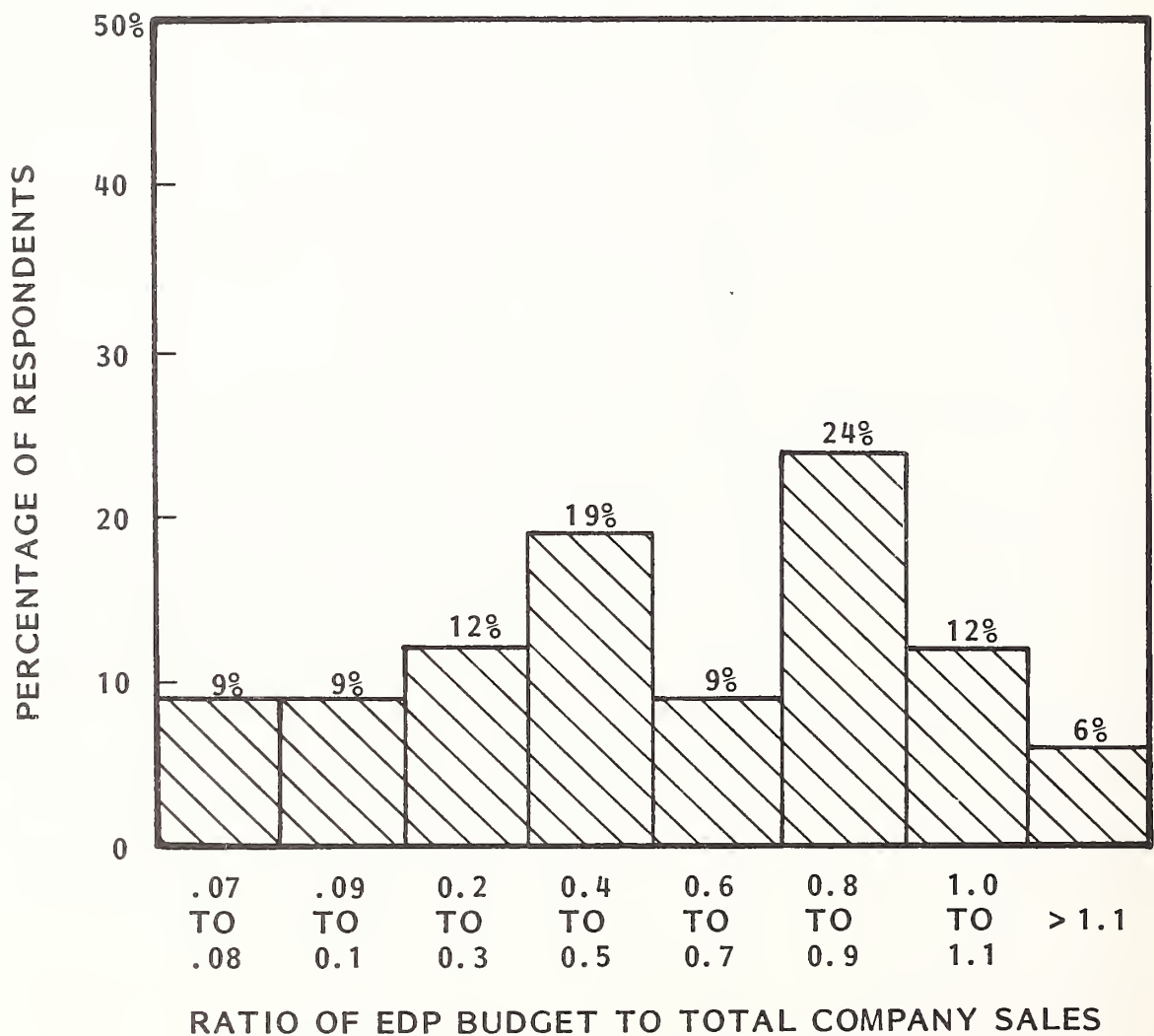
# EXHIBIT I-1

## RESPONDENT PROFILE-SERVICE AND OTHER SECTORS

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	18%	68%	14%
AVERAGE ANNUAL SALES	\$48M	\$329M	\$2,384M
AVERAGE TOTAL EMPLOYEES	829	3,809	43,500
AVERAGE EDP EMPLOYEES	19	57	466
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	2.3	1.5	1.1
AVERAGE EDP BUDGET	\$0.5M	\$1.7M	\$12.8M
EDP BUDGET % OF ANNUAL SALES	1.0%	0.5%	0.5%
EDP BUDGET PER EDP EMPLOYEE	\$26.3K	\$29.8K	\$27.5K
EDP BUDGET PER TOTAL EMPLOYEE	\$0.6K	\$0.4K	\$0.3K

## EXHIBIT I-2

### DISTRIBUTION OF EDP BUDGET TO COMPANY SALES RATIOS FOR RESPONDENTS IN THE SERVICE AND OTHER SECTORS



## 2. BUDGET AND EXPENDITURE ANALYSIS

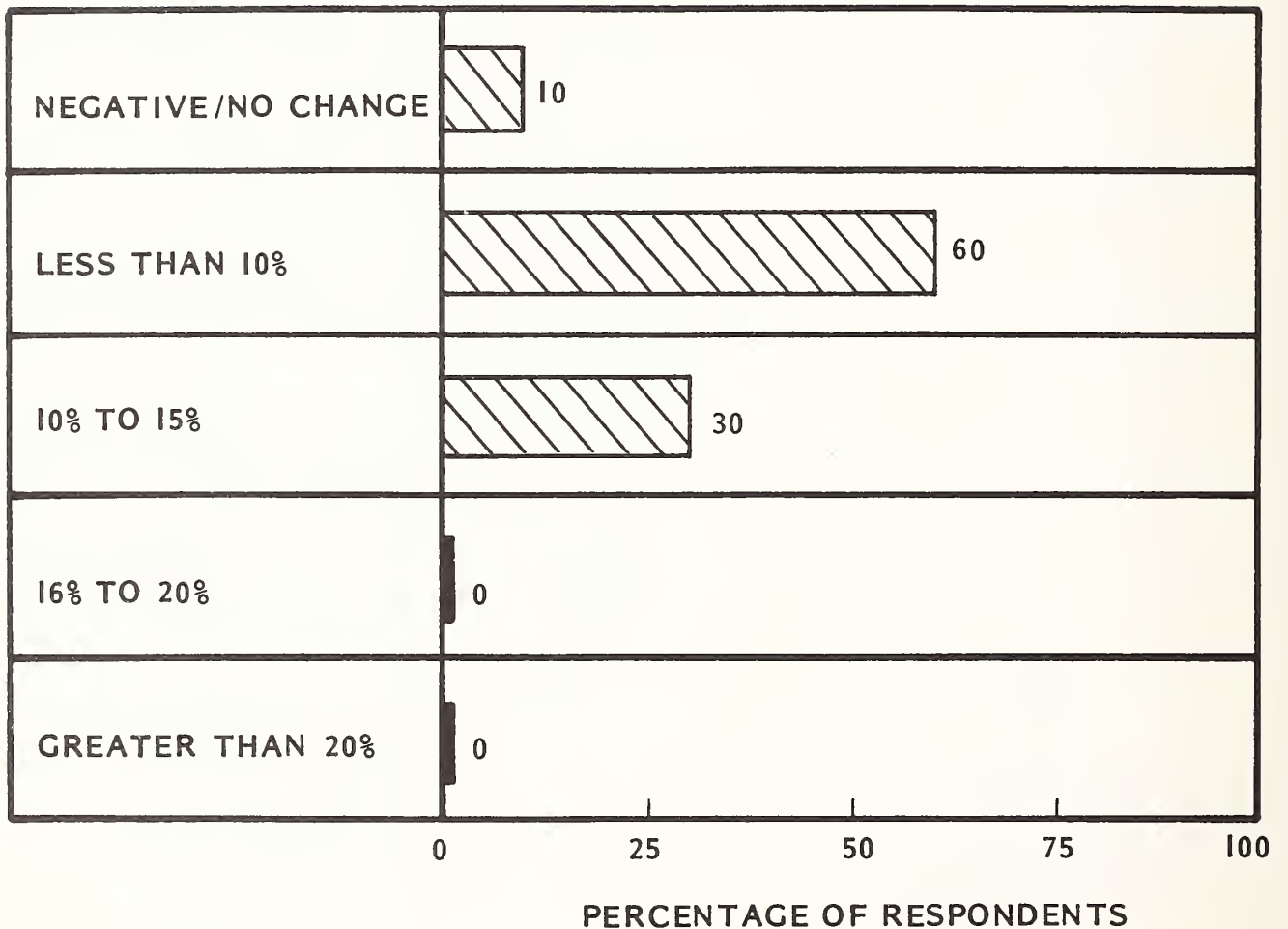
- EDP expenditures in the services and other sector will increase an average of 8% in 1979 according to respondents, but will continue at a higher rate of 10.5% through 1983. Exhibit 1-3 provides a distribution of planned budget growth for the 1978 to 1979 period.
- As a percentage of the total EDP budget, expenditures for small computers, terminals, communications, and software will rise in 1979 and 1980. During the same period, expenditures for mainframe computers, personnel, and miscellaneous other (supplies, forms, etc.) are forecast to decrease as a percentage as indicated in Exhibit 1-4 .
- Exhibit 1-5 provides a measure of the continuing growth of computer services and software in the process manufacturing sector as foreseen by EDP managers.
  - It should be noted that the decline or low increase in processing services expenditures represent significant differences from previous INPUT forecasts. It is our opinion that control of most outside services purchases is not usually vested in the central EDP department (the source of most data contained in this report).
  - Based on INPUT's forecast for the services industry, this sector should experience an increase from 1977 to 1978 of 21% for remote computing, 14% for batch processing, 23% for software products, 10% for professional services, and 16% overall.

## 3. MAJOR PLANS AND PROBLEMS

- Study respondents who were visited or contacted by telephone for this study were asked to rank the importance of certain EDP/communications factors. As shown in Exhibit 1-6 , the most important factors in this sector were personnel related.

# EXHIBIT I-3

## 1978-1979 PLANNED EDP BUDGET GROWTH FOR RESPONDENTS- SERVICE AND OTHER SECTORS



# EXHIBIT I-4

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE SERVICE AND OTHER SECTORS

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	28%	28%	25%	(11)%
SMALL COMPUTERS / PROGRAMMABLE TERMINALS	6	13	16	167
NON-PROGRAMMABLE TERMINALS	4	3	6	50
COMMUNICATIONS	3	3	5	67
SOFTWARE (PURCHASE/LEASE)	3	6	6	100
PERSONNEL	50	46	42	(16)
OTHER	8	0	0	(100)



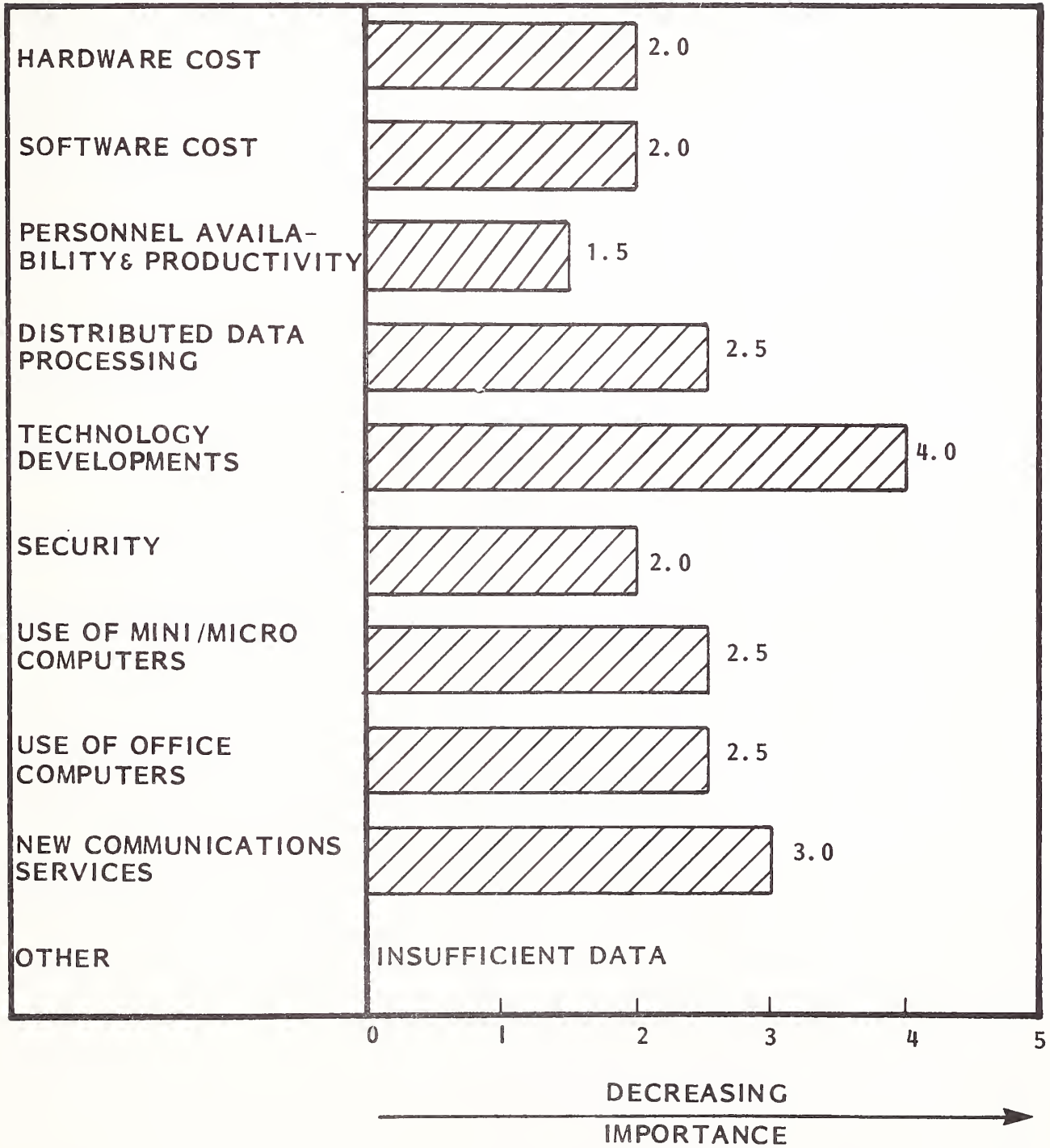
## EXHIBIT I-5

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE  
SERVICE AND OTHER SECTORS

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$ 28	\$ 30	7 %
REMOTE BATCH	50	50	0
BATCH	1000	1000	0
INPUT /OUTPUT	10	10	0
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$ 45	\$ 52	16 %
APPLICS. SOFTWARE	35	45	29
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$ 60	\$ 60	0 %
EDP CONSULTING	9	47	422
EDUCATION	20	16	(20)
OTHER	-	-	-
<u>FACILITIES MANAGEMENT</u>	-	-	-
<u>MAINTENANCE</u>	\$ 75	\$ 109	45 %

EXHIBIT 1-6

IMPORTANCE OF EDP/COMMUNICATION FACTORS RANKED  
BY RESPONDENTS IN THE SERVICE AND OTHER SECTORS



- All respondents to this study were queried regarding major EDP objectives for 1978, 1979, and 1980. Exhibit I-7 summarizes their responses and provides a ranking based on the number of mentions for major categories, although the data is not believed to be sufficient to ensure reliable conclusions:
  - On-line application development remained at a high level through 1980.
  - The implementation of data base and distributed data processing systems accounts for 80% of combined percentage of mention in 1980.
  - The installation of mainframes and minis declines as an objective in 1980.
- Personnel availability and productivity and need for improved operations are considered to be the most significant EDP problems in this sector as shown in Exhibit I-8 .
- Consistent with other manufacturing industry respondents, the services and other sector uses about as much of its equipment and application programming personnel resources for maintaining existing programs as developing new ones (see Exhibit I-9 ).
- Exhibit I-10 provides a list and a ranking of the most popular methods being used in this sector to reduce or improve the time and cost associated with the development of new applications.
  - The purchase of outside software comprises about one-fourth of all mentions.

# EXHIBIT I-7

## EDP OBJECTIVES FOR RESPONDENTS IN THE SERVICE AND OTHER SECTORS

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	0%	17%	40%
DESIGN/INSTALL DDP	13	0	40
NEW APPLICATIONS	0	0	0
ON-LINE APPLICATIONS	25	50	20
INSTALL/UPGRADE MAINFRAME	13	0	0
INSTALL MINIS	13	17	0
INSTALL OPERATING SYSTEM	0	0	0
IMPROVE OPERATIONS	25	0	0
CENTRALIZE (OR DECENTRALIZE)	0	0	0
OTHER*	<u>11</u> 100%	<u>16</u> 100%	<u>0</u> 100%
TOTAL MENTIONS	8	6	5

\*SPECIFIC RESPONSES INCLUDE:

- Communications Network
- Install Word Processor

# EXHIBIT I-8

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE SERVICE AND OTHER SECTORS

ITEM	% OF MENTIONS
NEED TO IMPROVE OPERATIONS	23%
PERSONNEL AVAILABILITY AND PRODUCTIVITY	20
LACK OF MANAGEMENT INVOLVEMENT AND UNDERSTANDING	13
INADEQUATE PLANNING METHODS	8
LACK OF USER INVOLVEMENT OR UNDERSTANDING	8
OTHER	28
<ul style="list-style-type: none"> <li>- INADEQUATE COMMUNICATIONS CAPABILITY</li> <li>- NEED FOR ADDITIONAL TRAINING</li> <li>- INADEQUATE SYSTEMS AND SOFTWARE</li> <li>- NEED FOR REORGANIZATION</li> <li>- LACK OF STANDARDS AND DOCUMENTATION</li> <li>- NEED TO IMPROVE APPLICATION DEVELOPMENT TIME</li> </ul>	

SOURCE: EDP USER PANEL

TOTAL MENTIONS = 61



# EXHIBIT I-9

## USE OF RESOURCES- SERVICE AND OTHER SECTORS

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT : <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	65% 13 15 7 <hr/> 100%
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL: <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	50% 46 4 <hr/> 100%

### OTHER MENTIONS INCLUDE:

<sup>1</sup>OVERHEAD AND REVENUES  
CONVERSION  
CONTROL AND ANALYSIS OF  
DATA CENTER  
OUTSIDE SERVICES  
IDLE  
ENGINEERING

<sup>2</sup>CONVERSION  
UTILITIES  
TRAINING



# EXHIBIT I-10

## METHODS USED TO IMPROVE TIME AND COSTS ASSOCIATED WITH APPLICATIONS DEVELOPMENT- SERVICE AND OTHER SECTORS

METHOD	% OF MENTIONS
PURCHASED SOFTWARE	24%
STRUCTURED METHODS	15
ON-LINE PROGRAMMING	12
INCREASED USER INVOLVEMENT	12
IMPROVED PLANNING	10
PROJECT MANAGEMENT SYSTEMS	7
OTHER	20
<ul style="list-style-type: none"> <li>- EDUCATION AND TRAINING</li> <li>- IMPROVED TESTING METHODS</li> <li>- DOCUMENTATION</li> <li>- HARDWARE UPGRADE</li> <li>- PERFORMANCE EVALUATION</li> </ul>	





1978 ANALYSIS OF EDP IN  
TRANSPORTATION

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1978 ANALYSIS OF EDP IN  
TRANSPORTATION





## TRANSPORTATION

### I. INDUSTRY SECTOR OVERVIEW

- The transportation sector is comprised of over 130,000 United States establishments with 3 million employees. Characteristically, transportation companies have a multiplicity of operating locations and a high requirement for communication.
  - A growing economy in 1977 was the main reason for rising railroad freight traffic and will be the dominant factor again in 1978.
  - Growth in gross national product and business inventories are boosting truck traffic again in 1978.
  - Airline revenue passenger miles are scheduled to grow at an annual rate of at least 5%.
- Respondents in this sector varied in their expectations of growth as a function of their subsector, from relatively low for railroads and transit companies to relatively high for motor freight.
- The importance of EDP in this sector varies more widely than in any others, ranging from vital in the airline category to minor in the transportation service category.
- Major EDP concerns for transportation companies are oriented along the lines of cost and improved price performance, perhaps reflecting a need to optimize previous system investments. No special concerns were displayed with regard to a 1979 recession and no special budget considerations were evidenced.

- Transportation yielded 23 responses in three different questionnaire categories, or 5% of the total for this report. The contributing industry groups included companies with SIC codes in the 40, 42, 44, 45, and 47 categories.
  - Of these, about two-thirds were motor freight and air transport firms. The United States Postal Service (SIC 43) was not solicited.
- Exhibit 1-1 provides a profile summary of respondents in the transportation sector for companies in three size categories.
  - Only 10% of the companies reported annual sales of less than \$100 million, averaging \$80 million. This average company employs 970 employees of which 14 (1.4%) are EDP personnel, and has an annual EDP budget of \$435,000 (.5% of annual sales), which translates to \$31,100 per EDP employee and about \$450 per total employee.
  - Seventy percent of the respondents ranged in size from \$100 million to \$1 billion in annual sales. The average company in this category has sales of \$162 million, employs 3,250 people of which 40 (1.2%) are involved in EDP and has an EDP budget of \$1.2 million which represents .7% of the company's annual sales.
  - The largest transportation companies responding to INPUT's survey average almost \$1.2 billion in annual sales and employ an average of 330 EDP personnel, about 1.3% of the total 26,000 employees. These companies reported EDP budgets which average \$19.7 million or 1.7% of their total company sales.
- Additional observations from Exhibit 1-1 include:
  - The EDP budget as a percent of annual sales increases with the size of the company, reflecting the investment required for larger and more complex systems. This is contrary to the situation found in the manufacturing sectors.

# EXHIBIT I-1

## RESPONDENT PROFILE - TRANSPORTATION SECTOR

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	10%	70%	20%
AVERAGE ANNUAL SALES	\$80M	\$162M	\$1.17B
AVERAGE TOTAL EMPLOYEES	970	3250	26,000
AVERAGE EDP EMPLOYEES	14	40	330
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	1.4	1.2	1.3
AVERAGE EDP BUDGET	\$435,000	\$1,184,000	\$19,733,000
EDP BUDGET % OF ANNUAL SALES	0.5%	0.7%	1.7%
EDP BUDGET PER EDP EMPLOYEE	\$31,100	\$29,600	\$59,800
EDP BUDGET PER TOTAL EMPLOYEE	\$448	\$364	\$760

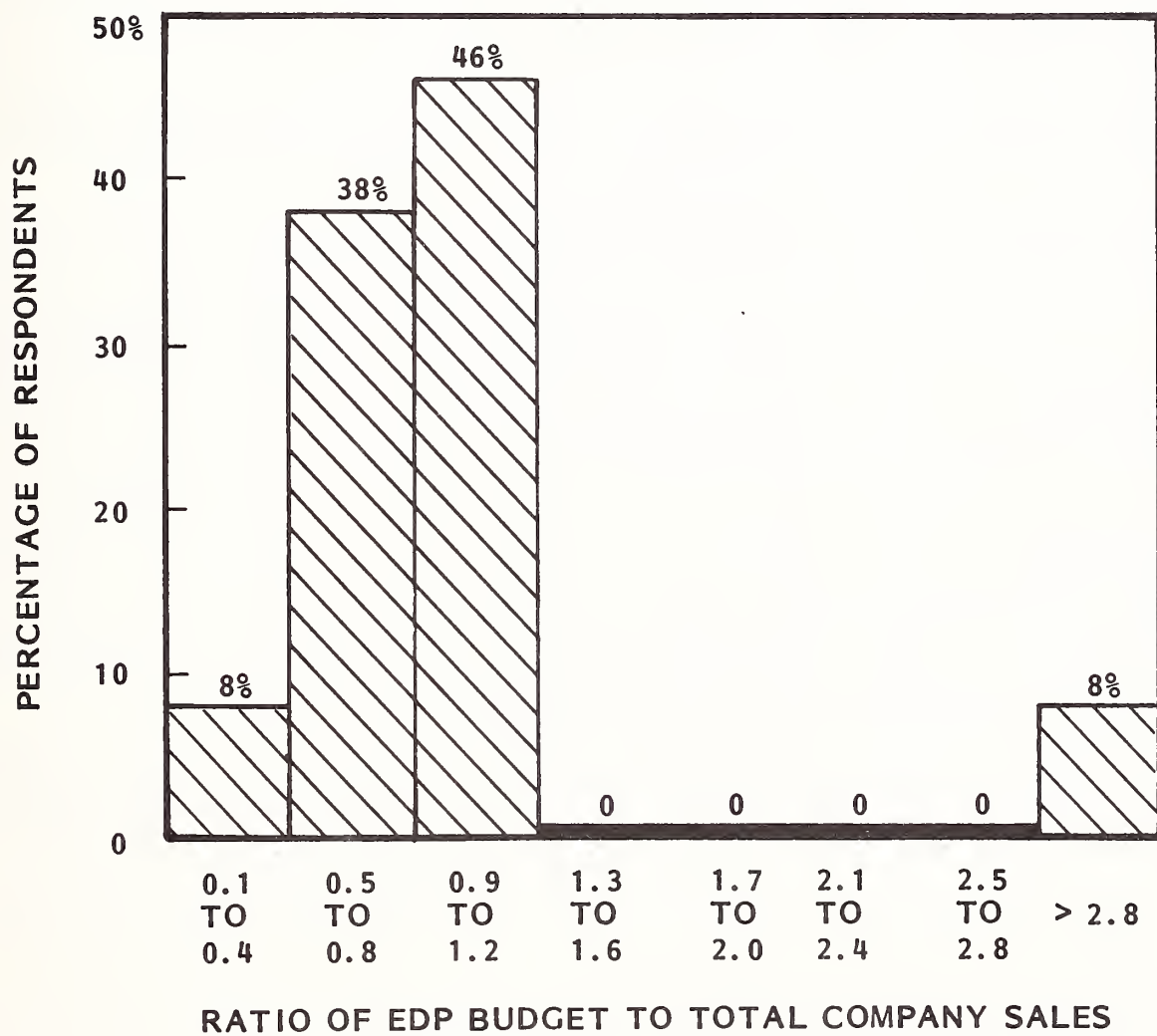
- The EDP budget per EDP employee and total employee statistics for large firms are considerably higher in transportation than in the manufacturing sector, although not as high as the utility sector and other service sectors.
- Exhibit I-2 provides a measure of the range of values for the ratio of EDP budget to total company sales reported by transportation respondents. The mean value for the industry is .8% compared to 1.27% for respondents across all industries.

## 2. BUDGET AND EXPENDITURE ANALYSIS

- EDP expenditures in the transportation sector will increase an average of 17% in 1979 according to respondents, but will continue at a lower rate through 1983. Exhibit I-3 provides a distribution of planned budget growth for the 1978 to 1979 period, and indicates the broad range of expectations reflected by the different types of companies that comprise this sector.
- As a percentage of the total EDP budget, expenditures for small computers, software, and personnel will rise steadily in 1979 and 1980. During the same period, expenditures for mainframe computers, non-programmable terminals, and communications are forecast to decrease as a percentage of expenses as indicated in Exhibit I-4 .
  - This was the only sector projecting a lower communications expenditure for 1979 and 1980.
- Exhibit I-5 provides a measure of the expenditures of computer services and software in the transportation sector as foreseen by EDP managers. As shown, significant increases are expected in 1978 for professional services and maintenance.
  - It should be noted that the decline or low increase in certain categories of services expenditures represent significant differences from previous

EXHIBIT 1-2

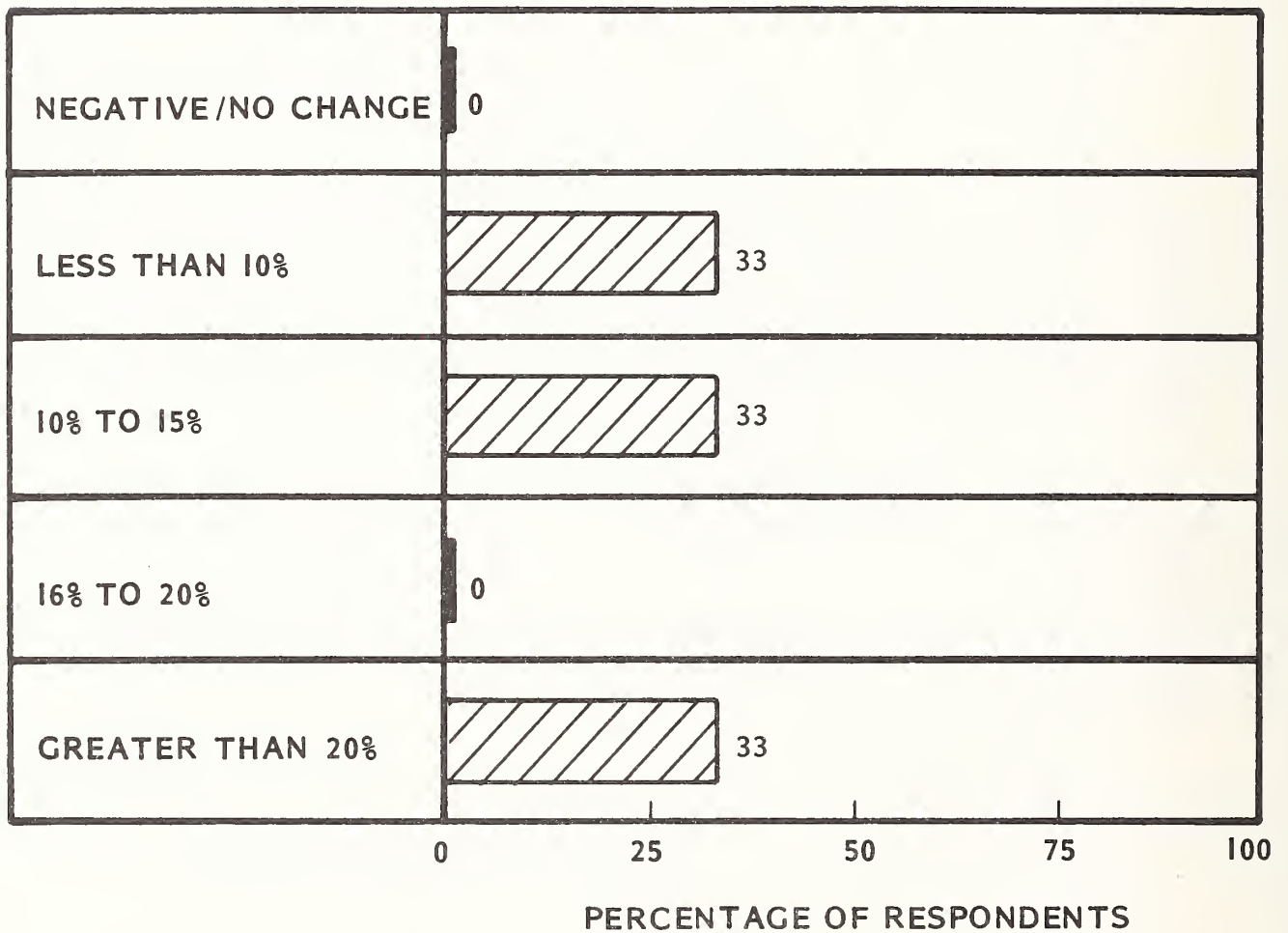
DISTRIBUTION OF EDP BUDGET TO  
COMPANY SALES RATIOS FOR RESPONDENTS IN THE  
TRANSPORTATION SECTOR





# EXHIBIT I-3

## 1978-1979 PLANNED EDP BUDGET GROWTH FOR RESPONDENTS - TRANSPORTATION SECTOR



# EXHIBIT I-4

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE TRANSPORTATION INDUSTRY

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	26%	28%	20%	(23)%
SMALL COMPUTERS / PROGRAMMABLE TERMINALS	3	4	4	33
NON-PROGRAMMABLE TERMINALS	6	3	3	(50)
COMMUNICATIONS	6	5	4	(33)
SOFTWARE (PURCHASE/LEASE)	3	5	6	100
PERSONNEL	45	48	48	7
OTHER	5	5	5	0

# EXHIBIT 1-5

## AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE TRANSPORTATION SECTOR

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$ 83	\$ 77	( 7)%
REMOTE BATCH	-	-	-
BATCH	5	7	40
INPUT/OUTPUT	6	11	83
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$ 44	\$ 30	(32)%
APPLICS. SOFTWARE	72	60	(17)
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$106	\$162	53 %
EDP CONSULTING	0	12	-
EDUCATION	15	18	20
OTHER	9	13	56
<u>FACILITIES MANAGEMENT</u>	-	-	-
<u>MAINTENANCE</u>	\$501	\$802	60%

INPUT forecasts. It is our opinion that control of most outside services purchases is not usually vested in the central EDP department (the source of most data contained in this report).

- While there is movement toward bringing remote computing services "in-house" which will reduce outside expenditures under EDP department control, there is still a significant increase in end user expenditure taking place as evidenced by other INPUT studies of the situation.
- The INPUT computer services market forecast for the transportation sector for the 1977-1978 period shows increases of 23% for remote computing, 17% for batch processing, 7% for software products, 17% for professional services, and 18% overall.

### 3. MAJOR PLANS AND PROBLEMS

- All respondents to this study were queried regarding major EDP objectives for 1978, 1979, and 1980. Exhibit I-6 summarizes their responses and provides a ranking based on the number of mentions for major categories.
  - New application development and on-line application development remains at a high level through 1980, accounting for two-thirds of all mentions.
  - The installation of mainframes and minicomputers picks up as an objective in 1979.
  - Plans for the implementation of data base and distributed data processing systems in transportation are the lowest for any industry.
- Exhibit I-7 provides an indication of the applications being planned and developed by the transportation sector, together with an indication of which applications are considered to be of highest priority.

# EXHIBIT I-6

## EDP OBJECTIVES FOR RESPONDENTS IN THE TRANSPORTATION SECTOR

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	5%	0%	0%
DESIGN/INSTALL DDP	0	0	0
NEW APPLICATIONS	20	18	11
ON-LINE APPLICATIONS	15	24	56
INSTALL/UPGRADE MAINFRAME	15	18	11
INSTALL MINIS	5	18	11
INSTALL OPERATING SYSTEM	15	5	11
IMPROVE OPERATIONS	15	12	0
CENTRALIZE (OR DECENTRALIZE)	5	5	0
OTHER*	<u>5</u> 100%	<u>0</u> 100%	<u>0</u> 100%
TOTAL MENTIONS	20	17	9

\*SPECIFIC RESPONSES INCLUDE:

- Long Range Planning



# EXHIBIT I-7

## APPLICATIONS TO BE DEVELOPED BY RESPONDENTS IN THE TRANSPORTATION SECTOR

APPLICATION	PERCENT OF MENTIONS	% OF MENTIONS AS HIGHEST PRIORITY
ACCOUNTING/FINANCE	20%	38%
COST SYSTEMS	6	0
INVENTORY CONTROL	9	8
ORDER ENTRY/BILLING	4	8
PERSONNEL/PAYROLL	15	8
PURCHASING	0	0
MARKETING/SALES	2	0
MODELING/FORECASTING	0	0
COMMUNICATIONS	0	0
GRAPHICS	0	0
SCIENTIFIC/ENGINEERING	4	0
DATA BASE	4	0
ELECTRONIC MAIL	0	0
WORD PROCESSING	0	0
PERFORMANCE MEASUREMENT	0	0
OTHER* (INDUSTRY SPECIFIC)	36	38
TOTAL	100%	100%

\*SPECIFIC APPLICATIONS INCLUDE:

- Industry Specialized
- Scheduling



- As is the case for manufacturing, accounting/finance applications rank high both in the number of mentions and the level of priority.
- Financial and administrative applications received more than one-half of the total mentions, outpacing marketing and technically oriented applications.
- Personnel availability/productivity and need for additional hardware capacity are considered to be the most significant EDP problems in the transportation sector as shown in Exhibit 1-8 .
- Compared with other industry sectors, transportation uses much more of its equipment and application programming personnel resources for developing new applications than for maintaining existing programs (see Exhibit 1-9 ).
- Exhibit 1-10 provides a list and a ranking of the most popular methods being used in the transportation sector to reduce or improve the time and cost associated with the development of new applications.
  - The purchase of outside software and the use of on-line programming techniques comprise 55% of all mentions.

#### 4. KEY ISSUE STATUS REVIEW

- Data base management systems of some type have been installed by one-third of the transportation industry respondents as shown in Exhibit 1-11 . In those installations:
  - Two-thirds of the systems were provided by IBM, one-third by other hardware vendors, and none by independent software suppliers.
  - The level of satisfaction with the DBMS systems is only acceptable, although no respondents are evaluating alternative packages.

# EXHIBIT I-8

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE TRANSPORTATION SECTOR

ITEM	% OF MENTIONS
PERSONNEL AVAILABILITY AND PRODUCTIVITY	24%
NEED FOR HARDWARE MIGRATION (LACK OF CAPACITY)	19
INADEQUATE SOFTWARE AND SYSTEMS	8
NEED FOR OPERATIONS IMPROVEMENT	8
LACK OF USER INVOLVEMENT IN SYSTEM AND APPLICATION DEVELOPMENT	5
INADEQUATE STANDARDS, PROCEDURES, AND DOCUMENTATION	5
OTHER	31
<ul style="list-style-type: none"> <li>- IMPROPER ORGANIZATION</li> <li>- LACK OF UNDERSTANDING BY NON-EDP MANAGEMENT</li> <li>- INSUFFICIENT COMMUNICATIONS CAPABILITY</li> <li>- LACK OF DBMS</li> <li>- NON-ADHERENCE TO STATED OBJECTIVES</li> <li>- UNSATISFACTORY PRICE PERFORMANCE</li> <li>- UNSATISFACTORY VENDOR SOFTWARE</li> <li>- INABILITY FOR REMOTE MAINTENANCE AND ON-LINE TESTING</li> </ul>	

# EXHIBIT I-9

## USE OF RESOURCES - TRANSPORTATION SECTOR

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT : <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	66% 19 11 4 <hr/> 100%
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL : <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	56% 41 3 <hr/> 100%

OTHER MENTIONS INCLUDE:

<sup>1</sup>TELEPROCESSING  
CORPORATE USE

<sup>2</sup>CONVERSION  
TELEPROCESSING AND SYSTEMS  
PROGRAMMING

EXHIBIT I-10

METHODS USED TO IMPROVE TIME AND COSTS  
ASSOCIATED WITH APPLICATIONS DEVELOPMENT -  
TRANSPORTATION SECTOR

METHOD	% OF MENTIONS
ON-LINE PROGRAMMING	33%
SOFTWARE PRODUCTS	22
STRUCTURED PROGRAMMING	11
IMPROVED STANDARDS	11
OTHER	23
- EDUCATION AND TRAINING	
- LONG-RANGE PLANNING	
- USER INVOLVEMENT	
- IMPROVED SCHEDULING	

# EXHIBIT I-11

## DATA BASE MANAGEMENT SYSTEM STATUS FOR RESPONDENTS IN THE TRANSPORTATION SECTOR

FACTOR/CONSIDERATION IN PERCENT OF RESPONDENTS		
DBMS INSTALLED	CURRENTLY EVALUATING ALTERNATIVE DBMS	
YES 33%	YES 0%	NO 17%
NO 67%	YES 17%	NO 66%
<p>IF DBMS INSTALLED:</p> <p><u>DEVELOPER</u></p> <ul style="list-style-type: none"> <li>● IBM 67%</li> <li>● OTHER HARDWARE 33</li> <li>● INDEPENDENT 0</li> </ul> <p><u>LEVEL OF SATISFACTION</u></p> <ul style="list-style-type: none"> <li>● SATISFIED 0%</li> <li>● ACCEPTABLE 100</li> <li>● DISSATISFIED 0</li> <li>● UNKNOWN 0</li> </ul> <p><u>YEAR OF INSTALLATION</u></p> <ul style="list-style-type: none"> <li>● 1978 0%</li> <li>● 1977 0</li> <li>● 1976 0</li> <li>● 1975 0</li> <li>● EARLIER 100</li> <li>● NO ANSWER 0</li> </ul>		

- All installations were made prior to 1976.
- Distributed data processing systems exist in none of the transportation respondent's firms. However, two-thirds are considering DDP systems, and only one-third indicate that DDP is not applicable (see Exhibit 1-12 ). Intended applications for this industry sector as given by respondents include:
  - Replacing standalone minis at regional locations.
  - Providing computer power at freight terminals.
  - Vehicle/rolling stock inventory.
- Exhibit 1-13 summarizes the status of various office automation involvement areas by EDP departments in transportation. Not surprisingly, the highest level of participation is in the data communications area with a reasonable level of participation in word processing. Facsimile and voice communication categories are receiving more attention than in most other industries.



# EXHIBIT I-12

## RESPONDENT INVOLVEMENT IN DISTRIBUTED DATA PROCESSING- TRANSPORTATION SECTOR

RESPONSE	PERCENT OF RESPONDENTS
DISTRIBUTED DATA PROCESSING ALREADY INSTALLED	0%
DISTRIBUTED DATA PROCESSING BEING IMPLEMENTED	0
DISTRIBUTED DATA PROCESSING UNDER CONSIDERATION	67
DISTRIBUTED DATA PROCESSING NOT APPLICABLE	33
TOTAL	100%

# EXHIBIT I-13

## RESPONDENT INVOLVEMENT IN OFFICE AUTOMATION- TRANSPORTATION SECTOR

AREA OF INVOLVEMENT	PERCENT OF RESPONDENTS		
	CURRENT	BETWEEN 1978 AND 1983	NOT BY 1983
ELECTRONIC MAIL	8%	25%	67%
WORD PROCESSING	31	46	23
COPYING/DUPLICATING	27	9	64
DATA COMMUNICATIONS	92	-	8
VOICE COMMUNICATIONS	36	22	42
FACSIMILE	36	9	55
VIDEO CONFERENCING	20	10	70







1978 ANALYSIS OF EDP IN  
UTILITIES



## ABOUT INPUT

### THE COMPANY

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international consulting firm. Clients include over 100 of the world's largest and most technically advanced companies.

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1978 ANALYSIS OF EDP IN  
UTILITIES



## UTILITY

### I. INDUSTRY SECTOR OVERVIEW

- The utility sector is comprised of over 20,000 establishments with nearly two million employees. The sector is dominated by telephone communications companies which employ more than 50% of the industry's personnel, and gas and electric with an additional one-third of the employees.
- Utility sector respondents generally anticipated company growth rates in keeping with overall industry growth. EDP is treated as a necessary capability but one with little or no impact on sales or company growth.
- Management attitudes toward EDP are related in large measure to the quality of service. Accordingly, topics such as reliability and improved training were discussed more frequently than new or improved technology. The attitude toward planning for a 1979 recession is "they don't usually affect us."
- Utility industry sector respondents provided 26 responses, or 5% of the total for this report. More than 80% came from gas and electric companies.
- Exhibit I-1 provides a profile summary of respondents in the utilities sector for companies in two size categories. Unlike other sectors, there were no respondents with less than \$100 million in annual sales (revenues).
  - Three-fourths of the companies ranged in size from \$100 million to \$1 billion in annual sales. The average company in this category has annual sales (revenues) of about \$300 million, employs 2,300 people of which 66 (2.9%) are involved in EDP, and has a budget of \$2.4 million which represents about .8% of the company's annual revenues. The company budgets \$36,400 for each EDP employee and slightly more than \$1,000 per year for each of its employees for EDP expenditures.

# EXHIBIT I-1

## RESPONDENT PROFILE - UTILITIES SECTOR

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	0	76%	24%
AVERAGE ANNUAL SALES	N.A.	\$302M	\$1,625M
AVERAGE TOTAL EMPLOYEES	N.A.	2,300	8,980
AVERAGE EDP EMPLOYEES	N.A.	66	187
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	N.A.	2.9	2.1
AVERAGE EDP BUDGET	N.A.	\$2.4M	\$9.0M
EDP BUDGET % OF ANNUAL SALES	N.A.	.79%	.55%
EDP BUDGET PER EDP EMPLOYEE	N.A.	\$36,400	\$48,100
EDP BUDGET PER TOTAL EMPLOYEE	N.A.	\$1,040	\$1,002

- The largest utility companies responding to INPUT's survey average \$1.6 billion in annual revenues and employ an average of 187 EDP personnel, slightly more than 2% of the total 9,000 employees. These companies reported EDP budgets which average \$9 million or .55% of total company sales. These budgets translate to EDP expenditures of \$48,000 for each EDP employee or \$1,000 for each company employee.

- Exhibit 1-2 provides a measure of the range of values for the ratio of EDP budget to total company sales (revenues) reported by utility sector respondents. The mean value for the industry is .7% compared to 1.27% for respondents across all industries.

## 2. BUDGET AND EXPENDITURE ANALYSIS

- EDP expenditures in the utilities sector will increase an average of 16% in 1979 according to respondents, but will continue at a somewhat lower rate through 1983. Exhibit 1-3 provides a distribution of planned budget growth for the 1978 to 1979 period and indicates a high level of growth (greater than 20%) expressed by one-half of the respondents.

- As a percentage of the total EDP budget, expenditures for small computers, communications, and software will rise steadily in 1979 and 1980. During the same period, expenditures for mainframe computers, personnel, and miscellaneous other (supplies, forms, etc.) are forecast to decrease as a percentage as indicated in Exhibit 1-4 .

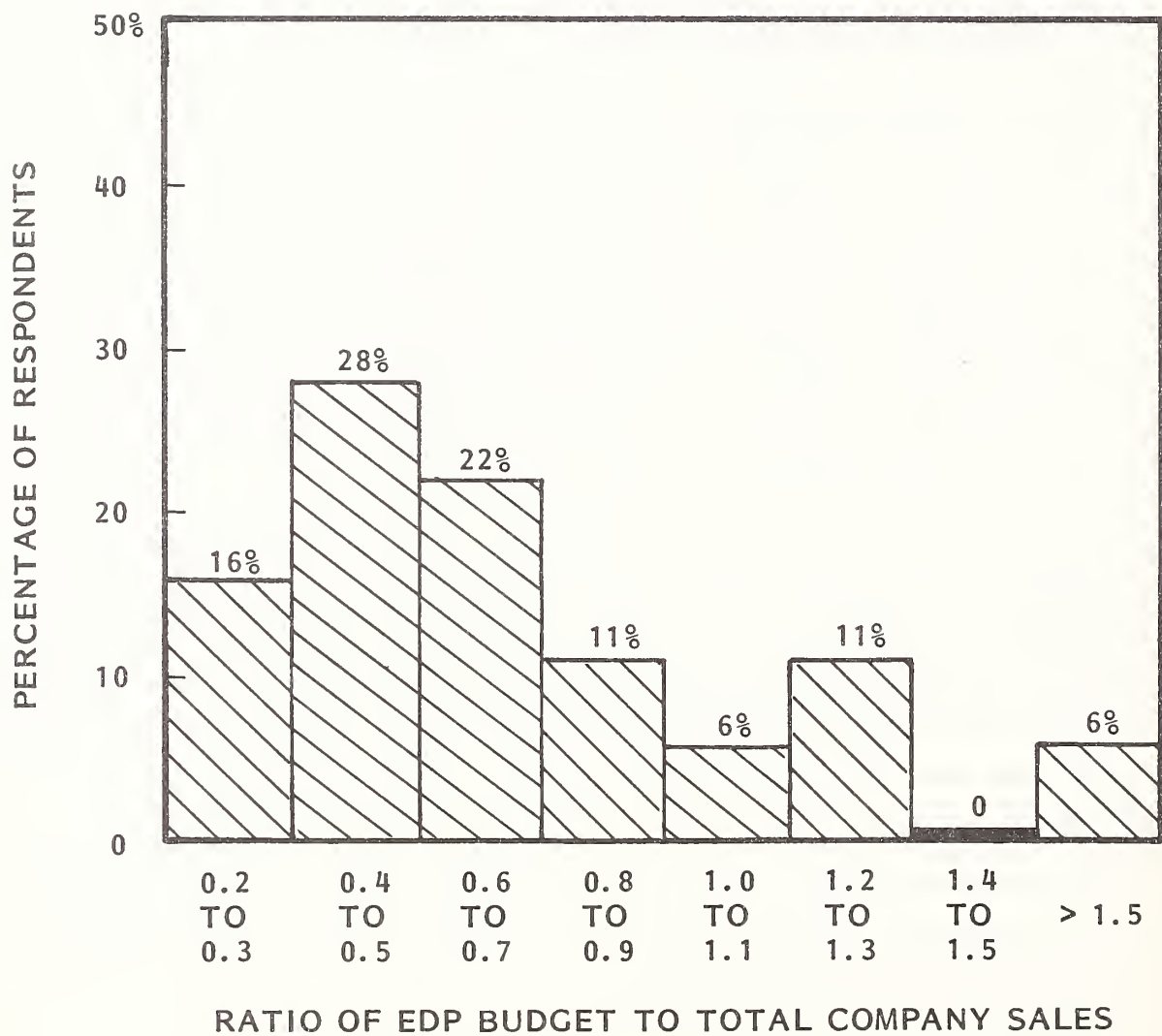
- Based on the expected 16% budget increase for 1979, the absolute dollar expenditure in every budget category will be higher except in the miscellaneous other category.

- Exhibit 1-5 provides a measure of the growth of computer services and software in the utilities sector as foreseen by EDP managers. As shown, significant increases are expected in 1978 for most types of services.



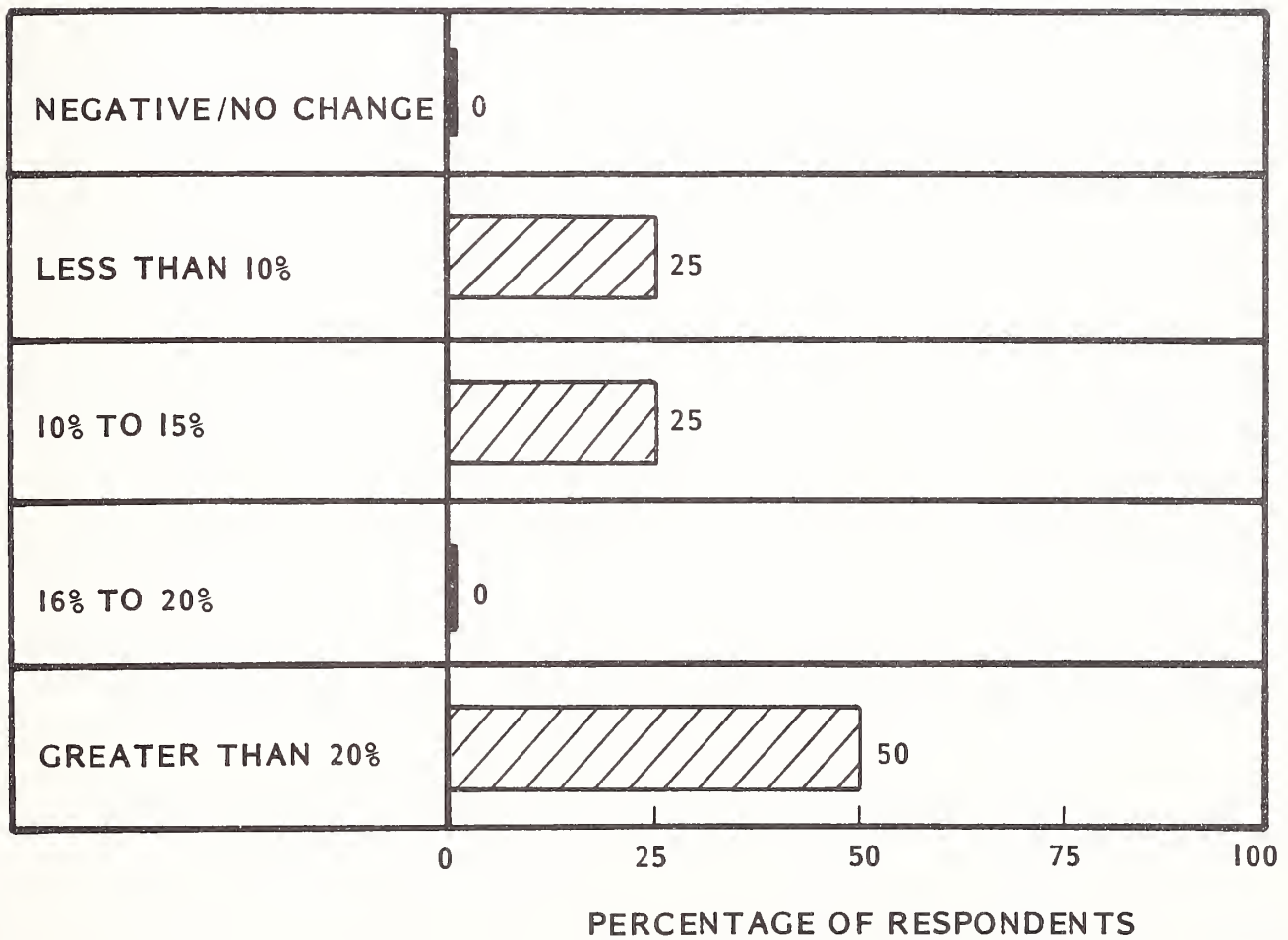
## EXHIBIT I-2

### DISTRIBUTION OF EDP BUDGET TO COMPANY SALES RATIOS FOR RESPONDENTS IN THE UTILITIES SECTOR



### EXHIBIT I-3

#### 1978-1979 PLANNED EDP BUDGET GROWTH FOR RESPONDENTS- UTILITIES SECTOR



# EXHIBIT I-4

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE UTILITIES SECTOR

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	27%	26%	25%	(7)%
SMALL COMPUTERS/ PROGRAMMABLE TERMINALS	3	4	5	67
NON-PROGRAMMABLE TERMINALS	3	3	3	0
COMMUNICATIONS	2	3	4	100
SOFTWARE (PURCHASE/LEASE)	2	3	3	50
PERSONNEL	49	44	46	(6)
OTHER	12	10	8	(33)

# EXHIBIT I-5

## AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE UTILITIES SECTOR

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$404	\$440	9 %
REMOTE BATCH	11	16	45
BATCH	150	200	33
INPUT /OUTPUT	74	62	(16)
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$ 76	\$ 85	12 %
APPLICS. SOFTWARE	45	61	36
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$204	\$101	(50)%
EDP CONSULTING	98	104	6
EDUCATION	32	38	19
OTHER	20	10	(50)
<u>FACILITIES MANAGEMENT</u>	-	-	-
<u>MAINTENANCE</u>	\$513	\$618	20%

- It should be noted that the forecasted services expenditures represent significant differences from previous INPUT forecasts. It is our opinion that control of most outside services purchases is not usually vested in the central EDP department (the source of most data contained in this report).
- The forecasts for this sector based on INPUT's study of the computer services industry for the 1977 to 1978 period shows increases of 18% for remote computing, 32% for batch services, 15% for software products, 12% for professional services, and 18% overall.

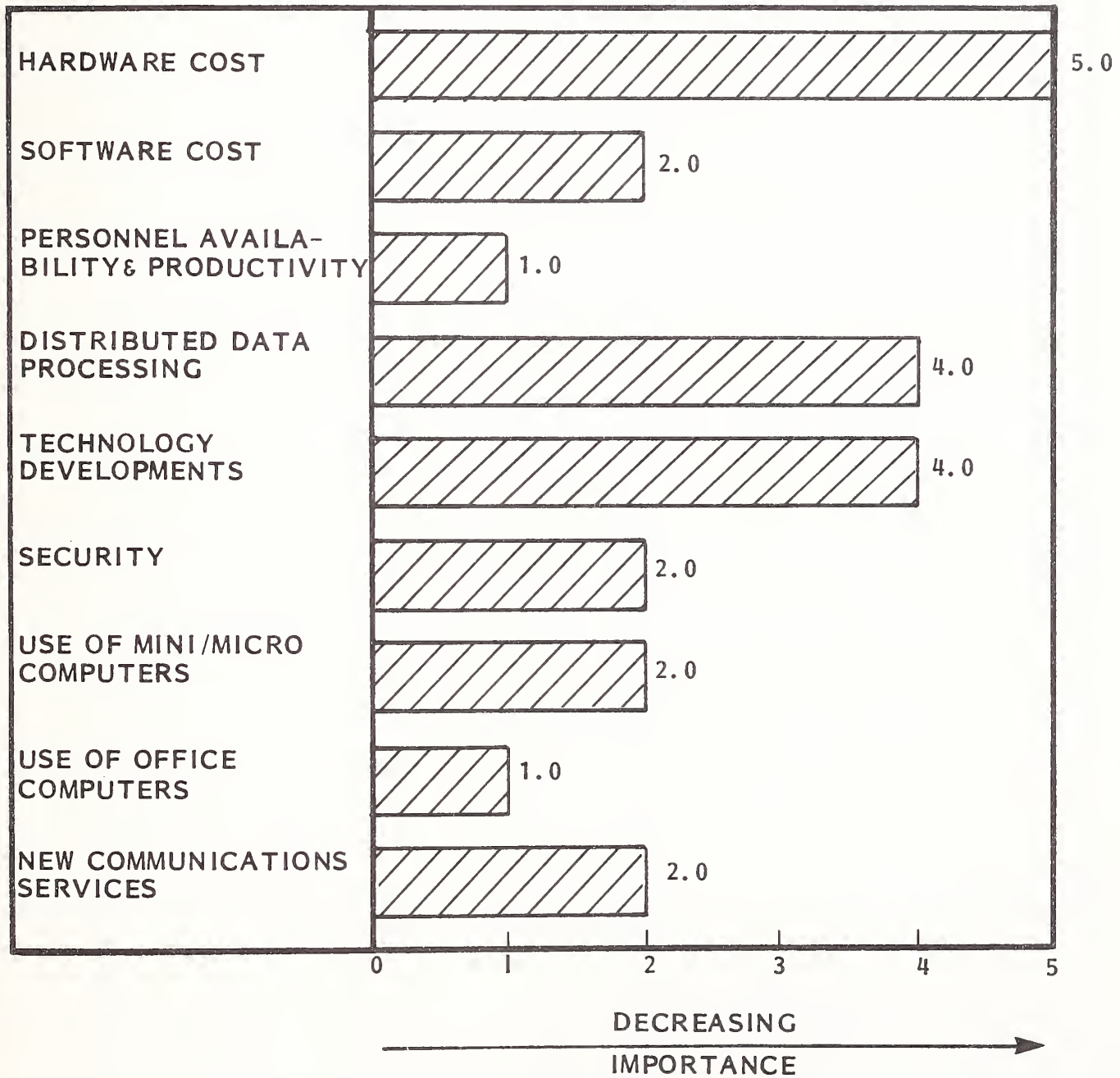
### 3. MAJOR PLANS AND PROBLEMS

- Study respondents who were visited or contacted by telephone for this study were asked to rank the importance of certain EDP/communications factors. As shown in Exhibit I-6 , the most important factors in the utilities sector were personnel availability and productivity and the use of office computers.
- All respondents to this study were queried regarding major EDP objectives for 1978, 1979, and 1980. Exhibit I-7 summarizes their responses and provides a ranking based on the number of mentions for major categories.
- On-line application development remained at a high level through 1980, accounting for nearly 20% of all mentions.
- The implementation of data base and distributed data processing systems doubles as a combined percentage of mention in 1980.
- The installation and upgrade of mainframes pick up as an objective in 1980, consistent with the expected high delivery rates of large scale systems among respondents.



EXHIBIT I-6

IMPORTANCE OF EDP/COMMUNICATION FACTORS RANKED  
BY RESPONDENTS IN THE UTILITIES SECTOR





# EXHIBIT I-7

## EDP OBJECTIVES FOR RESPONDENTS IN THE UTILITIES SECTOR

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	11%	10%	14%
DESIGN/INSTALL DDP	4	5	19
NEW APPLICATIONS	14	24	10
ON-LINE APPLICATIONS	11	24	19
INSTALL/UPGRADE MAINFRAME	11	14	19
INSTALL MINIS	4	5	5
INSTALL OPERATING SYSTEM	0	0	0
IMPROVE OPERATIONS	18	5	0
CENTRALIZE (OR DECENTRALIZE)	7	10	0
OTHER*	20 100%	3 100%	14 100%
TOTAL MENTIONS	28	21	21

\*SPECIFIC RESPONSES INCLUDE:

- Long Range Planning
- Communications Network
- Install Word Processor

- Exhibit I-8 provides an indication of the applications being planned and developed by the utilities sector, together with an indication of which applications are considered to be of highest priority.
  - Accounting/finance and data base applications rank high both in the number of mentions and the level of priority.
  - Financial and administrative applications received one-half of the total mentions far outpacing marketing and technically oriented applications.
- Personnel availability and productivity and the need for improved operations are considered to be the most significant EDP problems in the utilities sector as shown in Exhibit I-9 .
  - This represents a change from 1976 when data base implementation was given as the most significant problem.
- Consistent with most other industry sectors, the utilities sector uses nearly as much of its equipment and application programming personnel resources for maintaining existing programs as developing new ones (see Exhibit I-10 ).
- Exhibit I-11 provides a list and ranking of the most popular methods being used in the transportation sector to reduce or improve the time and cost associated with the development of new applications.
  - The purchase of outside software and the use of on-line programming techniques comprise 50% of all mentions.
- The expected increase in expenditures for communications and terminal devices through 1980 in the utilities sector is further clarified by analyzing the reasons for terminal installation for the same period. Exhibit I-12 provides such an analysis.

# EXHIBIT I-8

## APPLICATIONS TO BE DEVELOPED BY RESPONDENTS IN THE UTILITIES SECTOR

APPLICATION	PERCENT OF MENTIONS	% OF MENTIONS AS HIGHEST PRIORITY
ACCOUNTING/FINANCE	17%	23%
COST SYSTEMS	3	0
INVENTORY CONTROL	11	15
ORDER ENTRY/BILLING	5	8
PERSONNEL/PAYROLL	11	8
PURCHASING	2	8
MARKETING/SALES	0	0
MODELING/FORECASTING	9	0
COMMUNICATIONS	0	0
GRAPHICS	0	0
SCIENTIFIC/ENGINEERING	3	0
DATA BASE	19	23
ELECTRONIC MAIL	0	0
WORD PROCESSING	0	0
PERFORMANCE MEASUREMENT	0	0
OTHER* (INDUSTRY SPECIFIC)	20	15
TOTAL	100%	100%

\*SPECIFIC APPLICATIONS INCLUDE:

- Distribution

# EXHIBIT I-9

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE UTILITIES SECTOR

ITEM	% OF MENTIONS
PERSONNEL AVAILABILITY AND PRODUCTIVITY	23%
NEED FOR IMPROVED OPERATIONS	23
LACK OF USER INVOLVEMENT IN SYSTEM DEVELOPMENT	10
LACK OF LONG-RANGE EDP PLANS	10
EQUIPMENT /CAPACITY UPGRADE	7
NEED FOR REVISED EDP ORGANIZATION	7
INADEQUATE PROJECT MANAGEMENT AND CONTROL SYSTEMS	5
OTHER	15
- LACK OF DOCUMENTATION AND STANDARDS	
- INSUFFICIENT COMMUNICATIONS NETWORK	
- NEED FOR IMPROVED SOFTWARE	

# EXHIBIT I-10

## USE OF RESOURCES - UTILITIES SECTOR

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT: <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	<div>67%</div> <div>13</div> <div>10</div> <div>10</div> <hr/> <div>100%</div>
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL: <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	<div>47%</div> <div>48</div> <div>5</div> <hr/> <div>100%</div>

OTHER MENTIONS INCLUDE:

<sup>1</sup>UNUSED CAPACITY  
OUTSIDE SALES  
UTILITIES, LOGS, ETC.

<sup>2</sup>DATA ADMINISTRATION  
EDUCATION AND TRAINING



# EXHIBIT I-11

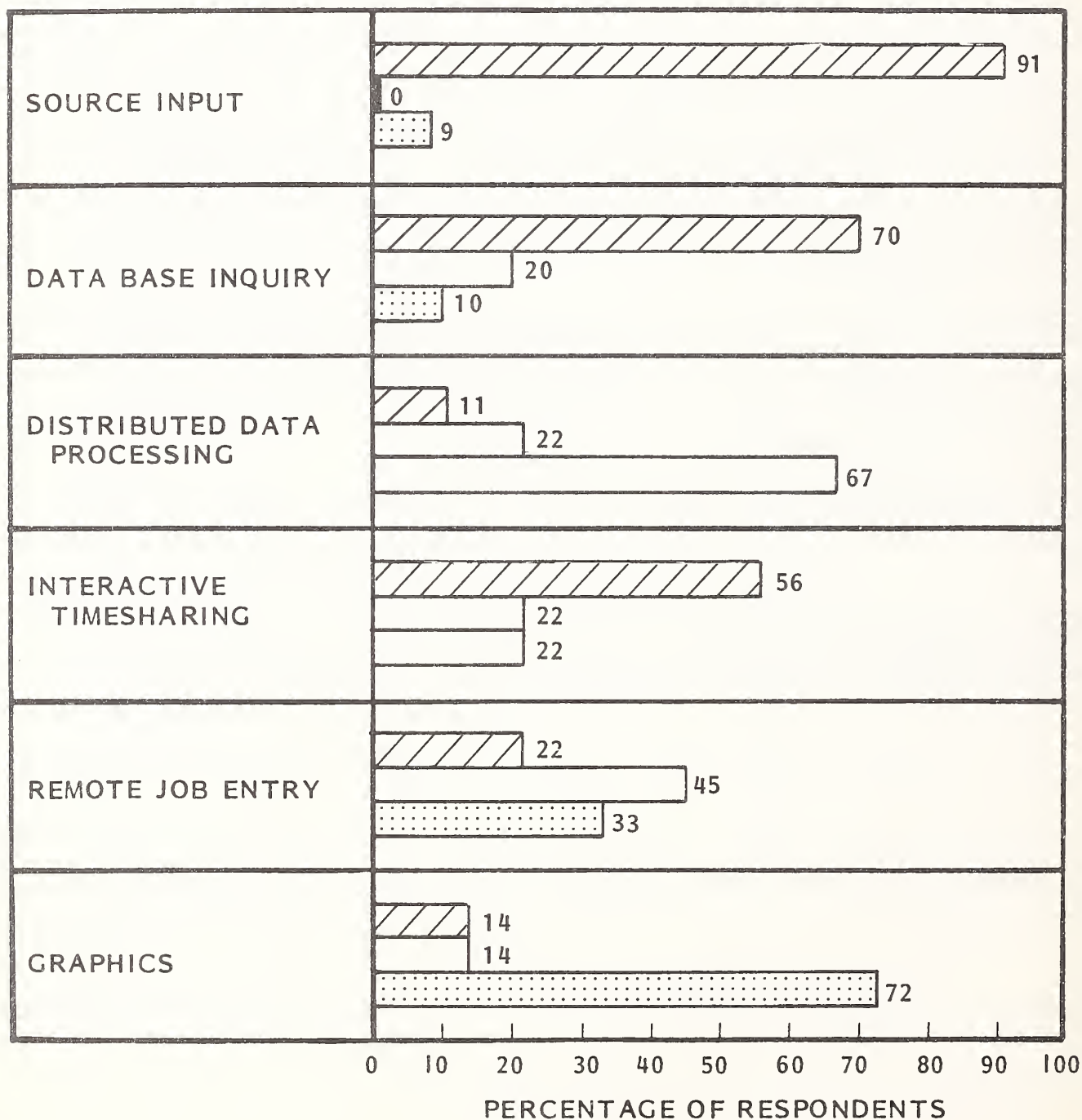
## METHODS USED TO IMPROVE TIME AND COSTS ASSOCIATED WITH APPLICATIONS DEVELOPMENT - UTILITIES SECTOR




METHOD	% OF MENTIONS
ON-LINE PROGRAMMING	28%
PURCHASED SOFTWARE	21
IMPROVED STANDARDS	14
STRUCTURED PROGRAMMING	10
PROJECT MANAGEMENT SYSTEMS	10
OTHER	17
<ul style="list-style-type: none"> <li>- HIGH LEVEL LANGUAGES</li> <li>- PERSONNEL EVALUATION SYSTEMS</li> <li>- DATA BASE MANAGEMENT SYSTEMS</li> </ul>	



# EXHIBIT I-12

## RELATIVE IMPORTANCE OF REASONS FOR INSTALLING TERMINALS DURING THE NEXT THREE YEARS- UTILITIES SECTOR



-  = HIGH IMPORTANCE
-  = MEDIUM IMPORTANCE
-  = LOW IMPORTANCE

- Ninety-one percent of respondents indicate that source data input requirements were of high importance in terms of terminal installations for the next three years.
- Seventy percent of the respondents stated that data base inquiry was a high importance reason for installing terminals.
- Interactive timesharing is considered to be of high importance by more than one-half of the respondents. This is not the case in most other industry sectors.

#### 4. KEY ISSUE STATUS REVIEW

- Data base management systems of some type have been installed by 45% of the utility industry respondents as shown in Exhibit I-13 . In those installations:
  - Fifty percent of the systems were provided by IBM, 50% by other hardware vendors, and none by independent software suppliers.
  - The general level of satisfaction with the DBMS systems installed is divided with half of the respondents satisfied and one-sixth dissatisfied.
  - Most of the DBMS installations were made prior to 1976.
- Distributed data processing systems exist in less than 10% of the utilities industry respondent's firms. However, nearly 75% are considering DDP systems, and only 18% indicate that DDP is not applicable (see Exhibit I-14 ). DDP uses and intended applications for this industry sector as given by respondents include:
  - Remote processing in outlying plants, offices, and subsidiaries.
  - Remote front-end computing.

# EXHIBIT I-13

## DATA BASE MANAGEMENT SYSTEM STATUS FOR RESPONDENTS IN THE UTILITIES SECTOR

FACTOR/CONSIDERATION IN PERCENT OF RESPONDENTS		
DBMS INSTALLED	CURRENTLY EVALUATING ALTERNATIVE DBMS	
YES 45%	YES 8%	NO 42%
NO 55%	YES 25%	NO 25%
<p>IF DBMS INSTALLED:</p> <p><u>DEVELOPER</u></p> <ul style="list-style-type: none"> <li>● IBM 50%</li> <li>● OTHER HARDWARE 50</li> <li>● INDEPENDENT 0</li> </ul> <p><u>LEVEL OF SATISFACTION</u></p> <ul style="list-style-type: none"> <li>● SATISFIED 50%</li> <li>● ACCEPTABLE 33</li> <li>● DISSATISFIED 17</li> <li>● UNKNOWN 0</li> </ul> <p><u>YEAR OF INSTALLATION</u></p> <ul style="list-style-type: none"> <li>● 1978 0%</li> <li>● 1977 17</li> <li>● 1976 0</li> <li>● 1975 66</li> <li>● EARLIER 17</li> <li>● NO ANSWER 0</li> </ul>		

EXHIBIT I-14

RESPONDENT INVOLVEMENT IN DISTRIBUTED DATA PROCESSING -  
UTILITIES SECTOR

RESPONSE	PERCENT OF RESPONDENTS
DISTRIBUTED DATA PROCESSING ALREADY INSTALLED	9%
DISTRIBUTED DATA PROCESSING BEING IMPLEMENTED	0
DISTRIBUTED DATA PROCESSING UNDER CONSIDERATION	73
DISTRIBUTED DATA PROCESSING NOT APPLICABLE	18
TOTAL	100%

- Inquiry and file update.
  - Accounting data input.
- Exhibit I-15 summarizes the status of various office automation involvement areas by EDP departments in utilities. Not surprisingly, the highest current level of participation is in the data communications area with a high level of participation in word processing expected by 1983. Consistent with other industry sectors, video conferencing is not expected to be the subject of much attention.

EXHIBIT I-15

RESPONDENT INVOLVEMENT IN OFFICE AUTOMATION -  
UTILITIES SECTOR

AREA OF INVOLVEMENT	PERCENT OF RESPONDENTS		
	CURRENT	BETWEEN 1978 AND 1983	NOT BY 1983
ELECTRONIC MAIL	- %	43%	57%
WORD PROCESSING	67	33	-
COPYING/DUPLICATING	33	11	56
DATA COMMUNICATIONS	100	-	78
VOICE COMMUNICATIONS	11	11	78
FACSIMILE	25	12	63
VIDEO CONFERENCING	-	-	100









1978 ANALYSIS OF EDP IN  
WHOLESALE DISTRIBUTION

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1978 ANALYSIS OF EDP IN  
WHOLESALE DISTRIBUTION





## WHOLESALE DISTRIBUTION

### I. INDUSTRY SECTOR OVERVIEW

- The wholesale distribution industry sector is overwhelmingly characterized by small establishments, 99% of which have fewer than 100 employees. In both groups that comprise the sector, durable and non-durable goods, there are fewer than 100 firms with sales exceeding \$100 million annually and none with sales of \$1 billion or more.
- Because of its structure, the primary interest in the wholesale sector for this report stems from its use of EDP and how this use parallels that found in the distribution functions of large manufacturing firms.
- Sales of merchant wholesalers in 1978 are expected to be up about 10% to \$590 billion and employment is expected to increase by 2% to 4.5 million employees. Wholesaling in the past decade has kept pace with overall economic growth: total sales as a percentage of GNP grew from 26 to almost 29%.
- Computers and computerized systems are considered to be a key to productivity in this sector and are increasingly being used to step up efficiency in both receipt and placement of orders with manufacturers.
- Wholesale distribution provided 20 responses, about 4% of the total for this study. The contributing industry groups included companies in both SIC 50 and SIC 51 categories with almost 75% coming from non-durable goods distributors.
- Exhibit I-1 provides a profile summary of respondents in the wholesale distribution sector for companies in two size categories:

# EXHIBIT I-1

## RESPONDENT PROFILE - WHOLESALE DISTRIBUTION SECTOR

PROFILE CHARACTERISTIC	COMPANY SIZE IN TERMS OF ANNUAL SALES/REVENUES		
	LESS THAN \$100 MILLION	\$100-999 MILLION	MORE THAN \$1000 MILLION
PERCENT OF RESPONDENTS	11%	89%	0%
AVERAGE ANNUAL SALES	\$55M	\$388M	N.A.
AVERAGE TOTAL EMPLOYEES	850	2,528	N.A.
AVERAGE EDP EMPLOYEES	14	38	N.A.
EDP EMPLOYEES PER 100 TOTAL EMPLOYEES	1.6	1.5	N.A.
AVERAGE EDP BUDGET	\$0.4M	\$1.4M	N.A.
EDP BUDGET % OF ANNUAL SALES	0.7%	0.4%	N.A.
EDP BUDGET PER EDP EMPLOYEE	\$28.5K	36.8K	N.A.
EDP BUDGET PER TOTAL EMPLOYEE	\$0.5K	\$0.6K	N.A.

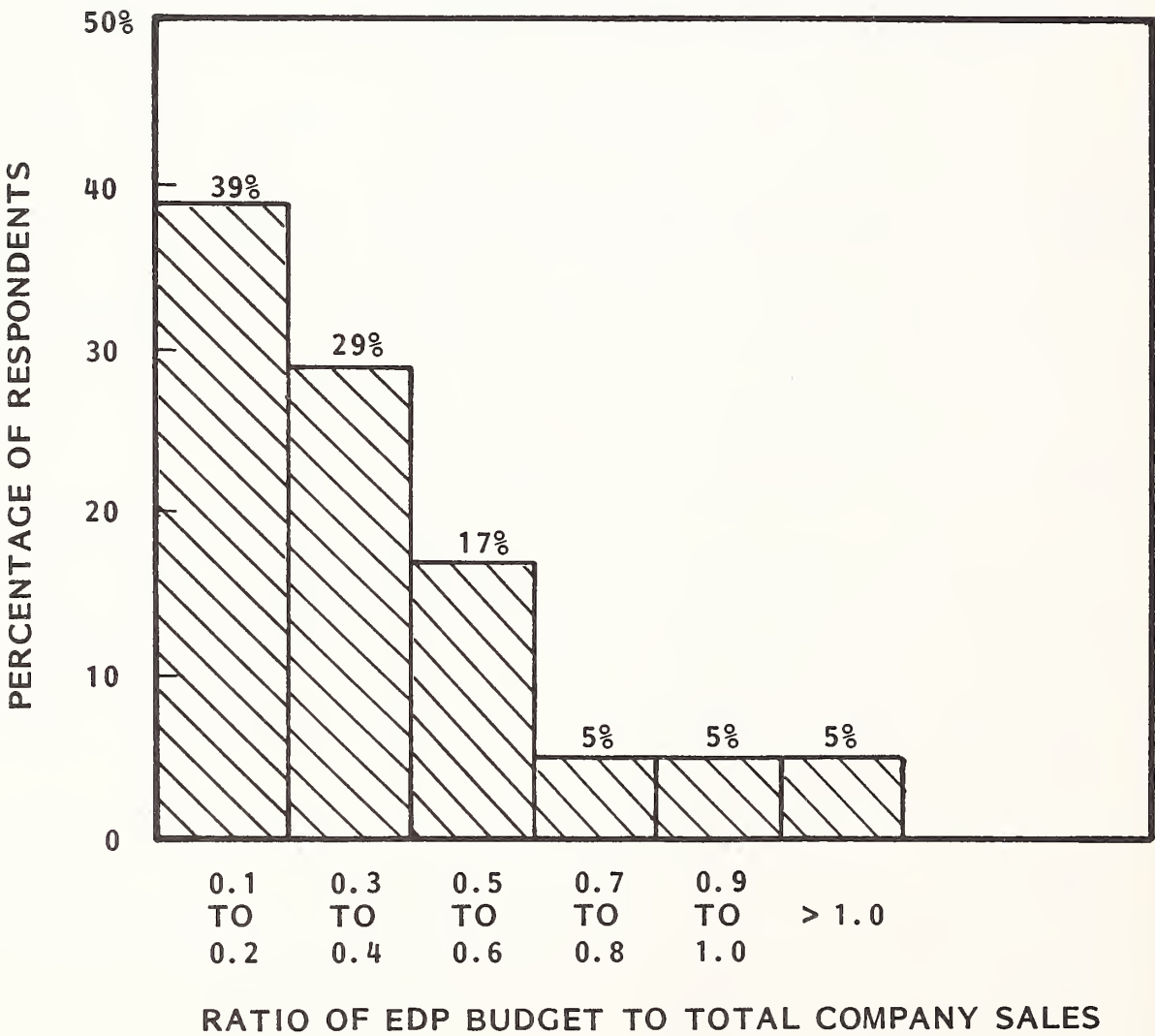
- Eleven percent (two companies) of the companies reported annual sales of less than \$100 million, averaging \$55 million. The average company employs 850 employees of which 14 (1.6%) are EDP personnel, and has an annual EDP budget of \$400,000 (.7% of annual sales). This translates to \$28,500 per EDP employee, and about \$500 per total company employee.
- Eighty-nine percent (17 companies) of the companies ranged in size from \$100 million to \$1 billion in annual sales. The average responding company in this category has sales of \$388 million, employs 2,500 people of which 38 (1.5%) are involved in EDP, and has an EDP budget of \$1.4 million which represents .4% of the company's annual sales.
- Exhibit I-2 provides a measure of the range of values for the ratio of EDP budget to total company sales reported by wholesale distribution respondents. The mean value for the industry is .61% compared to 1.27 for respondents across all industries.

## 2. BUDGET AND EXPENDITURE ANALYSIS

- As a percentage of the total EDP budget, expenditures for small computers and programmable terminals, communications, and personnel will rise in 1979 and 1980. During the same period, expenditures for mainframe computers and miscellaneous other (supplies, forms, etc.) are forecast to decrease as a percentage as indicated in Exhibit I-3 .
- Exhibit I-4 provides an estimate of the continuing growth of computer services and software in the process manufacturing sectors as foreseen by EDP managers. As shown, significant increases are expected in 1978 for batch processing and education services.
- It should be noted that the decline or low increase in certain processing services expenditures represent significant differences from previous INPUT forecasts. It is INPUT's opinion that control of most outside

EXHIBIT 1-2

DISTRIBUTION OF EDP BUDGET TO  
COMPANY SALES RATIOS FOR RESPONDENTS IN THE  
WHOLESALE DISTRIBUTION SECTOR



# EXHIBIT 1-3

## ANTICIPATED CHANGES IN EDP BUDGETS FOR RESPONDENTS IN THE WHOLESALE DISTRIBUTION SECTOR

BUDGET CATEGORY	% OF TOTAL EDP BUDGET			INCREASE (DECR.) 1978 TO 1980
	1978	1979	1980	
MAIN COMPUTERS	28%	27%	25%	(11)%
SMALL COMPUTERS / PROGRAMMABLE TERMINALS	2	2	4	100
NON-PROGRAMMABLE TERMINALS	4	4	4	0
COMMUNICATIONS	4	4	6	50
SOFTWARE (PURCHASE/LEASE)	4	4	4	0
PERSONNEL	45	47	47	4
OTHER	14	11	11	(21)



# EXHIBIT I-4

## AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE IN THE WHOLESALE DISTRIBUTION SECTOR

TYPE OF SERVICE	1977 EXPENDI- TURES AVERAGE IN \$000	1978 EXPENDI- TURES AVERAGE IN \$000	PERCENT CHANGE 1977 VS. 1978
<u>PROCESSING SERVICES</u>			
INTERACTIVE	\$ 43	\$ 37	(14)%
REMOTE BATCH	17	18	6
BATCH	147	200	36
INPUT /OUTPUT	9	8	(11)%
<u>SOFTWARE PRODUCTS</u>			
SYSTEMS SOFTWARE	\$ 22	\$ 30	36 %
APPLICS. SOFTWARE	32	21	(34)
<u>PROFESSIONAL SERVICES</u>			
CONTR. PROGRAMMING	\$ 34	\$ 36	6 %
EDP CONSULTING	17	4	(76)
EDUCATION	5	12	140
OTHER	6	17	183
<u>FACILITIES MANAGEMENT</u>	-	-	-
<u>MAINTENANCE</u>	46	43	(7)%

services purchases is not usually vested in the central EDP department (the source of most data contained in this report).

- Based on overall usage studies performed by INPUT for this sector, forecasts show 1978 increases of 23% for remote computing services, 12% for batch services, 19% for software products, and 14% for professional services, a total of 16% overall.

### 3. MAJOR PLANS AND PROBLEMS

- All respondents to this study were queried regarding major EDP objectives for 1978, 1979, and 1980. Exhibit I-5 summarizes their responses and provides a ranking based on the number of mentions for major categories.
  - New application development and on-line application development remained at a high level through 1980, accounting for more than 50% of all mentions.
  - Despite the industry's known push to install mini computers, this is not ranked high on the objective list for any of the three years.
- Exhibit I-6 provides an indication of the applications being planned and developed by the wholesale distribution sector, together with an indication of which applications are considered to be of highest priority.
  - Accounting/finance, inventory control and order entry applications rank high both in the number of mentions and the level of priority.
  - Financial and administrative applications received three-fourths of the total mentions, far outpacing marketing and technically oriented applications.
- Personnel availability and productivity are considered to be the most significant EDP problems in the wholesale sector as shown in Exhibit I-7.

# EXHIBIT I-5

## EDP OBJECTIVES FOR RESPONDENTS IN THE WHOLESALE DISTRIBUTION SECTOR

OBJECTIVE	PERCENT OF MENTIONS		
	1978	1979	1980
DATA BASE DEVELOPMENT	12%	13%	9%
DESIGN/INSTALL DDP	4	8	9
NEW APPLICATIONS	12	17	36
ON-LINE APPLICATIONS	24	29	18
INSTALL/UPGRADE MAINFRAME	12	17	9
INSTALL MINIS	8	4	9
INSTALL OPERATING SYSTEM	12	0	0
IMPROVE OPERATIONS	8	0	0
CENTRALIZE (OR DECENTRALIZE)	0	4	9
OTHER*	8 <u>100%</u>	8 <u>100%</u>	1 <u>100%</u>
TOTAL MENTIONS	25	24	11

\*SPECIFIC RESPONSES INCLUDE:

- Long Range Planning
- Communications Network

# EXHIBIT I-6

## APPLICATIONS TO BE DEVELOPED BY RESPONDENTS IN THE WHOLESALE DISTRIBUTION SECTOR

APPLICATION	PERCENT OF MENTIONS	% OF MENTIONS AS HIGHEST PRIORITY
ACCOUNTING/FINANCE	21%	20%
COST SYSTEMS	0	0
INVENTORY CONTROL	26	47
ORDER ENTRY/BILLING	18	20
PERSONNEL/PAYROLL	5	7
PURCHASING	5	6
MARKETING/SALES	2	0
MODELING/FORECASTING	4	0
COMMUNICATIONS	0	0
GRAPHICS	0	0
SCIENTIFIC/ENGINEERING	2	0
DATA BASE	5	0
ELECTRONIC MAIL	0	0
WORD PROCESSING	0	0
PERFORMANCE MEASUREMENT	0	0
OTHER* (INDUSTRY SPECIFIC)	12	0
TOTAL	100%	100%

\*SPECIFIC APPLICATIONS INCLUDE:

- Manufacturing
- Scheduling

# EXHIBIT I-7

## MOST SIGNIFICANT EDP PROBLEMS BY RESPONDENTS IN THE WHOLESALE DISTRIBUTION SECTOR

ITEM	% OF MENTIONS
PERSONNEL AVAILABILITY AND PRODUCTIVITY	24%
NEED FOR TRAINING AND IMPROVED UNDERSTANDING	12
LACK OF USER INVOLVEMENT IN SYSTEM DEVELOPMENT	10
INADEQUATE SYSTEMS AND SOFTWARE	7
LACK OF MANAGEMENT UNDERSTANDING INVOLVEMENT	7
NEED FOR IMPROVED PLANNING	7
INADEQUATE PROJECT MANAGEMENT AND CONTROL SYSTEMS	7
NEED FOR COST REDUCTION OR PRICE/PERFORMANCE IMPROVEMENT	7
OTHER	19
<ul style="list-style-type: none"> <li>- INADEQUATE DOCUMENTATION OR STANDARDS</li> <li>- LACK OF SUFFICIENT BUDGET</li> <li>- NEED FOR BETTER CHARGEBACK SYSTEM</li> <li>- EXCESSIVE APPLICATION DEVELOPMENT TIME</li> </ul>	



- Consistent with other industry respondents, the wholesale distribution sector uses nearly as much of its equipment and application programming personnel resources maintaining existing program as developing new ones (see Exhibit I-8 ).
  - It should be noted that the use of computer equipment for production (74%) is one of the highest reported with several respondents indicating 85% utilization.
- Exhibit I-9 provides a list and a ranking of the most popular methods being used in the wholesale sector to reduce or improve the time and cost associated with the development of new applications.
  - The use of on-line programming techniques comprises 27% of all mentions.
- The expected increase in expenditures for communications and terminal devices through 1980 in the wholesale sector is further clarified by analyzing the reasons for terminal installation for the same period. Exhibit I-10 provides such an analysis.
  - Eighty-eight percent of respondents indicate that source data input requirements were of high importance in terms of terminal installations for the next three years.
  - Three-fourths of all respondents stated that data base inquiry was a high important reason for installing terminals.
  - Interactive timesharing has dropped to the point where all respondents rank it as a low important reason for terminal installation.



# EXHIBIT 1-8

## USE OF RESOURCES - WHOLESALE DISTRIBUTION SECTOR

RESOURCE UTILIZATION CATEGORIES	RESPONDENT AVERAGE
<ul style="list-style-type: none"> <li>● COMPUTER EQUIPMENT: <ul style="list-style-type: none"> <li>- PRODUCTION RUNS</li> <li>- NEW APPLICATION DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>1</sup></li> </ul> </li> </ul>	74% 14 11 1 <hr/> 100%
<ul style="list-style-type: none"> <li>● APPLICATION PROGRAMMING PERSONNEL: <ul style="list-style-type: none"> <li>- NEW PROGRAM DEVELOPMENT</li> <li>- EXISTING PROGRAM MAINTENANCE</li> <li>- OTHER<sup>2</sup></li> </ul> </li> </ul>	50% 43 7 <hr/> 100%

OTHER MENTIONS INCLUDE:

<sup>1</sup>SYSTEMS WORK

<sup>2</sup>ADMINISTRATION  
O.S. CONVERSION

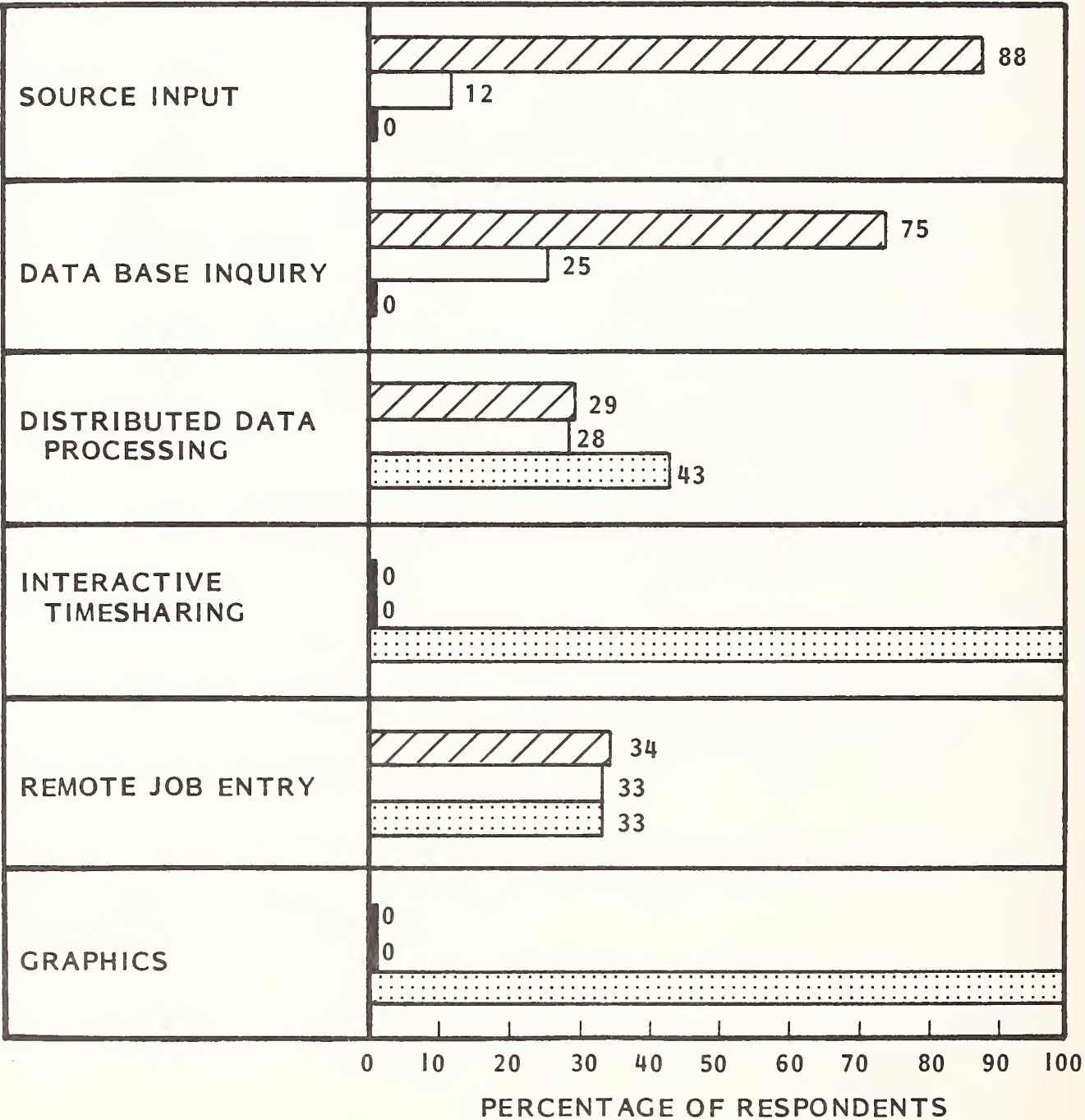
EXHIBIT I-9




METHODS USED TO IMPROVE TIME AND COSTS  
ASSOCIATED WITH APPLICATIONS DEVELOPMENT -  
WHOLESALE DISTRIBUTION SECTOR

METHOD	% OF MENTIONS
ON-LINE PROGRAMMING	27%
PROJECT MANAGEMENT SYSTEMS	14
PURCHASED SOFTWARE	14
TRAINING AND EDUCATION	14
STRUCTURED METHODS	9
DATA BASE MANAGEMENT	9
OTHER	13
- USER INVOLVEMENT	
- IMPROVED TESTING	
- IMPROVED DESIGN METHODS	

EXHIBIT I-10

RELATIVE IMPORTANCE OF REASONS FOR INSTALLING TERMINALS  
DURING THE NEXT THREE YEARS -  
WHOLESALE DISTRIBUTION SECTOR



-  = HIGH IMPORTANCE
-  = MEDIUM IMPORTANCE
-  = LOW IMPORTANCE

#### 4. KEY ISSUE STATUS REVIEW

- Data base management systems of some type have been installed by 50% of the wholesale respondents as shown in Exhibit I-11 . In those installations:
  - Fifty percent of the systems were provided by IBM and 50% by independent software suppliers.
  - The general level of satisfaction with the DBMS system is good, although some respondents reported dissatisfaction.
  - All of the installations were made in 1976 or earlier.
- No distributed data processing systems exist currently in any of the wholesale distribution respondents' firms. However, systems, 75% are considering DDP systems, and only 12% indicate that DDP is not applicable (see Exhibit I-12 ). DDP uses and intended applications for this industry sector as given by respondents include:
  - Product distribution.
  - Perpetual inventory.
  - Distributed data base.
  - Data entry.
- Exhibit I-13 summarizes the status of various office automation involvement areas by EDP departments in wholesale distribution. Not surprisingly, the highest level of participation is in the data communications area with a reasonable level of participation in word processing and electronic mail expected by 1983. Consistent with other industry sectors, video conferencing is not expected to be the subject of much attention.

# EXHIBIT I-11

## DATA BASE MANAGEMENT SYSTEM STATUS FOR RESPONDENTS IN THE WHOLESALE DISTRIBUTION SECTOR

FACTOR/CONSIDERATION IN PERCENT OF RESPONDENTS		
DBMS INSTALLED	CURRENTLY EVALUATING ALTERNATIVE DBMS	
YES 50%	YES 0%	NO 50%
NO 50%	YES 25%	NO 25%
<p>IF DBMS INSTALLED :</p> <p><u>DEVELOPER</u></p> <ul style="list-style-type: none"> <li>● IBM 50%</li> <li>● OTHER HARDWARE 0</li> <li>● INDEPENDENT 50</li> </ul> <p><u>LEVEL OF SATISFACTION</u></p> <ul style="list-style-type: none"> <li>● SATISFIED 50%</li> <li>● ACCEPTABLE 25</li> <li>● DISSATISFIED 25</li> <li>● UNKNOWN 0</li> </ul> <p><u>YEAR OF INSTALLATION</u></p> <ul style="list-style-type: none"> <li>● 1978 0%</li> <li>● 1977 0</li> <li>● 1976 25</li> <li>● 1975 50</li> <li>● EARLIER 25</li> <li>● NO ANSWER 0</li> </ul>		

# EXHIBIT I-12

## RESPONDENT INVOLVEMENT IN DISTRIBUTED DATA PROCESSING - WHOLESALE DISTRIBUTION SECTOR

RESPONSE	PERCENT OF RESPONDENTS
DISTRIBUTED DATA PROCESSING ALREADY INSTALLED	0%
DISTRIBUTED DATA PROCESSING BEING IMPLEMENTED	13
DISTRIBUTED DATA PROCESSING UNDER CONSIDERATION	75
DISTRIBUTED DATA PROCESSING NOT APPLICABLE	12
TOTAL	100%



# EXHIBIT I-13

## RESPONDENT INVOLVEMENT IN OFFICE AUTOMATION- WHOLESALE DISTRIBUTION SECTOR

AREA OF INVOLVEMENT	PERCENT OF RESPONDENTS		
	CURRENT	BETWEEN 1978 AND 1983	NOT BY 1983
ELECTRONIC MAIL	11%	33%	56%
WORD PROCESSING	25	25	50
COPYING/DUPLICATING	22	34	44
DATA COMMUNICATIONS	82	18	-
VOICE COMMUNICATIONS	11	-	89
FACSIMILE	25	12	63
VIDEO CONFERENCING	-	-	100









